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ABSTRACT

This is a selection of papers that have appeared in the journal "Sign Language Studies" between 1972 and 1979. The aim is to provide the reader with some knowledge of the world as signers see it. The book is for academic decision-makers, teachers and parents of deaf students, as well as the intellectually curious. Following an introductory essay, the chapters are arranged in four sections: (1) The first section addresses the broad question "What is Sign Language?" with articles about the language merging situation involving manually encoded English and American Sign Language, as well as other aspects of sign language, including humor and foreign sign languages. (2) The second section on "Learning and Using Sign Language" gets deeply into a psycholinguistic vein, and presents findings on sign language acquisition and learning. (3) The third section, "(Sign) Language and Culture," relates sign language use and particular attitudes and policies to the deaf community. (4) The fourth chapter reinforces the idea that language is not all biological nor all socio-cultural, and applies this idea to sign language acquisition. (Author/PJM)

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SIGN AND CULTURE

A Reader for Students of American Sign Language

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edited by
William C. Stokoe

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PREFACE

Students of sign language need, along with vocabulary drills and conversational practice, some knowledge of the world as signers see it. Academic decision makers may admit petitions to use sign language as a foreign language or as a doctoral working language, but they also need to know of the cultural nexus—those intricate connections between a signed or a spoken language and the society that uses it. Teachers of deaf pupils facing the choice of one or another manual communication method as one component in "total communication" need a background for intelligent choice—or for adjusting to a choice already made for them. Parents of deaf children face an agonizing decision: whether to accept the negative view of deaf people and their signing as represented by oralists or to look for some evidence that the use of signing has a positive side.

A single book can hardly satisfy such diverse and deep needs, but this selection of papers that have appeared in Sign Language Studies between 1972 and 1979 has been made to give students, educators, teachers, and parents as well as the intellectually curious useful information. Following an introductory essay "The Study and Use of Sign Language" the chapters are arranged in four sections.

The first section addresses the broad question "What is sign language?" Woodward and Markowicz show how gestural-visual behavior communicating in language continuously merges manually encoded English with American Sign Language, two quite different languages; and they go on to show how these two languages in contact lead to another, Pidgin Sign English, formed in the same way as other pidgins. Clifford Abbott restates the question and asks and answers how grammars of spoken and signed languages encode information variously. Dennis Cokely and Rudy Gawlik describe a fascinating language variety not often studied in formal language courses: Childrenese, the age-graded language of children and adolescents, whose signing in metropolitan Washington is little different from that of deaf contemporaries in suburban Oak Park. In "Wit and Poetry in American Sign Language" Edward Klima and Ursula Bellugi display the relations of sign language expression to the humor and imagination of its deaf signers. Robbin Battison and King Jordan, with first hand evidence gained from dozens of signers from as many countries, point out what is fact and what fancy in "Cross-Cultural Communication with Foreign Signers," and find that signed languages are as localized and as regionally special as are spoken languages. Susan Fischer and Bonnie Gough discuss in detail some of the central grammatical features in "Verbs in American Sign Language."

The second section, on "Learning and Using Sign Language," gets deeply into a psycholinguistic vein. Judy Williams describes what may be the ideal way for a deaf child to grow up knowing two languages equally well, the natural sign language of the family and friends and the manually encoded English of school and deaf-hearing interaction. Marina McIntire describes the typical stagewise learning by a deaf child to control the formation of the words of her parents' sign language. Ray Stevens looks at the larger learning scene, the school, and finds the discoveries of Piaget and other leading psycholinguists still not being used as they deserve—deaf children in school are being taught English as if they were adults who must learn by rule and logic, not by doing. Marvin Sallop recounts a personal and successful teaching experience: his pushing and pulling his pupils up a series of steps by his willingness to accept appropriate use of gestural language output. John Bonvillian, Keith Nelson, and Veda Charrow consider in depth the value of signing for deaf children as well as for children with other language learning needs.

The third section, "(Sign) Language and Culture," relates sign language use and public attitudes and policies to the deaf community. Harry Markowicz presents the whole panorama in a remarkably prophetic (1972) essay. William

Stokoe, Russell Bernard, and Carol Padden focus on a small elite group in the deaf community and find some remarkable indications of the power of sign language to link and to separate members of social networks.

Three chapters in the fourth section reinforce two basic truths that enthusiasts sometimes forget. Language is not all biological, although a capacity for and a necessity for language use are part of being born human. And, language is not all socio-cultural, although innate capacity withers without human interaction and the born-human individual does not gain full humanity. Pat Siple shows how the physiology of seeing constrains sign aspects (What Acts, Action, Place) to conform to the requirements of the visual field, the interactive distance, and the central importance of faces and eyes in sign language and face-to-face interaction. Adam Kendon relates sign language to Language by his microanalysis of gesticulation, the system all speakers use along with their speech; he finds gesticulation a deeper, earlier learned way of expressing inner language structures. Finally Susan Goldin-Meadow and Heidi Feldman describe what may be the ultimate experiment, after Herodotus, in language origin. Children they observed had no spoken language input and were allowed to see no sign language; and yet the children developed, stage-by-stage, out of their innate language capacity and their interaction with attentive investigators, a workable language of gestures that they and no one else devised.

The differing lengths of the four sections do not indicate the relative importance of the four themes, but they do show approximately the relative amount of study, research, and writing that has been devoted to sign language itself, to learning and teaching it, to the society that most uses it, and to the implications that sign languages of deaf people have for biological, linguistic, and socio-cultural theory.

Selecting these eighteen studies from the more than one hundred which have appeared in Sign Language Studies has not been easy. I have been guided of course by numbers of requests for reprints and offprints from fellow teachers, but I am deeply conscious that a great many of the papers not chosen might have served as well to develop the themes of this selection or other pertinent ideas. As a corrective to my editorial choice the wise reader of this selection will keep at hand the whole run of *Sign Language Studies*, the journal that has published since 1972 more than ten times the number of studies of sign language than have appeared in other periodicals.

I am sincerely grateful to the twenty-four authors of the following chapters and to their fellow authors in *SLS*. Together, they constitute a group of scientists as likely to change the world significantly for the better as any. A longer debt of gratitude is owing to my earliest sign language teachers and collaborators—the late Elizabeth Benson, Richard M. Phillips, Rex Lowman, Carl and Eleanor Croneberg, Dot Casterline, Jack Gannon, Vilas Johnson, Ben Schowe, Roy Stewart... If I have been able to give some shape to an idea of the language and culture of the American Deaf Community, credit goes to those already named and to other colleagues: Leon and Hortense Auerbach, Allen and Florence Crammatte, Don and Agnes Padden, Bill and Babs Stevens, Tom Berg, Sully Bushnaq, Fred Schreiber, Terry O'Rourke, Gene Bergman, Boyce Williams, Barbara Kannapell, Larry Fleischer, Larry Berke, Tom Humphries, Gil and June Eastman, Yerker Andersson, Bernard Bragg, Katie Brown, Bob Davila, Bob and Kitty Dillman, Hal Domich, Merv Garretson, Lin Smith, Jerry Jordan, Marybeth Miller, Ron Nomeland, Al Pimentel, Debbie Sonnenstrahl, Frank Turk, John Schrœdel — the list could go on for pages more, and I hope those unintentionally omitted will understand and accept my thanks as well; for this is just the beginning of an enumeration of the members of a community whose language, culture, and shared experiences have greatly enriched the life of an outsider, an outsider humbly grateful for their hospitality and shared wisdom.

SIGN & CULTURE

A READER FOR STUDENTS OF AMERICAN SIGN LANGUAGE

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INTRODUCTION:

THE STUDY AND USE OF SIGN LANGUAGE

William C. Stokoe

Formal education of deaf persons in America was at its outset in 1817 synonomous with sign language use. The method of teaching in signs of the natural sign language used by deaf persons themselves and augmented with signs invented to represent grammatical and lexical signals was easily adapted to the American scene by Laurent Clerc, the deaf teacher who learned it in France. As in France and many other countries to which it had spread, this method produced in a few school generations an educated deaf elite that urged its continuance with vigor. However, for reasons that would require a good sized history to explain, the educational use of sign languages in the United States and in most countries declined. During most of the twentieth century signing has been strictly prohibited in some schools, discouraged and neglected in many, and even if permitted for out of classroom use has been studiously ignored by teachers and staff in most schools for the deaf.

Beginning about 1970, an educational philosophy known now as "total communication" (Denton 1972) has been adopted in a growing number of schools. It permits the deaf pupil to use manual as well as vocal and written means of expressing English, and at least encourages the teachers to use their hands for signing and fingerspelling; but its implementation has seldom included recognition of the distinct natural and complete sign language used in the American Deaf Community.

Now linguists and sociolinguists have joined deaf people —who of course never stopped signing—to insist that the natural language for interaction among those who cannot hear be given a central role in their education. Increasing discontent with the low achievement of the average deaf child in school has also turned attention to sign language. There are more than 70,000 pupils in schools and programs reporting to the Annual Survey of Hearing Impaired Children and Youth. Some studies show a superiority on standard tests of deaf children whose instruction and early experience included use of manual means of communication; but as yet there are no large numbers of deaf children with a natural sign language as their primary language to support the commonsense view that a bilingual approach may work better than a mixture of means or the prohibition of some channels outright. The few case studies are impressive (see Chapters 7 and 8 below), but sign languages remain too little studied and used.

Sign language is a central fact in the life of deaf individuals and groups, and this essay will treat it as a natural focus as well for educational efforts. This will require looking at the relation of Sign to English, for English is another central fact in the lives of American deaf people. "Sign" is used here as a short and pronounceable abbreviation for the proper name, American Sign Language, sometimes abbreviated ASL or Ameslan (with the disadvantage in the first case of adding to "alphabet soup" and in the latter of being pronounced variously to rime with Pakistan, homage slang, dristan, and almost gone).

While sign languages generally and Sign in particular make excellent objects for scientific study—e.g. by anthropologists, linguists, and psychologists; the present intent is to treat Sign as a prime educational medium and as a language that can make a deaf person both a sharer in general American culture and also a member of a special group with its own self awareness and pride. To treat Sign in this way requires first to look at some of the different ways that languages are presented to the eye instead of to the ear. Second, it requires an examination of bilingualism and its special place in the life and education of deaf persons. Third, we will look at ways for concerned teachers to apply research findings in their own work. Finally, teachers will be shown ways to ask and answer questions of importance about Sign; i.e. to do practical research in the study of sign language for themselves.

Sight, language, and speech. Education for deaf children confronts a central fact: sight instead of hearing is the sense that conveys language symbols to the person who cannot hear. In the history of systematic education this fact has not always been faced squarely. The French pioneers, Épée, Sicard, and Valade, in harmony with the empirical and scientific spirit of the Enlightenment (Seigel 1969), founded their teaching on this fact; visibly distinct signals for French grammatical features were built into their programs of instruction. But even in Épée's lifetime, Heinicke challenged the French approach, insisting that words and the ideas they stood for could never be presented inside the mind without sounds. The controversy, in letters, between Épée and Heinicke began in 1780, and Paris, Leipzig, Vienna—the whole intellectual world of Europe—became embroiled. The decision of the Rector and Fellows of the Academy of Zurich in Épée's favor in 1783 did not end this controversy (Garnett 1968). The fact remains, however, that eyes and not ears are the deaf person's prime symbol receivers.

Heinicke and his modern heirs follow a train of reasoning that turns away from this central fact; he began by teaching "deaf-motes" to make sounds, thence "to read and speak clearly and with understanding." At least that is his claim. Like all readers, his pupils had to use their eyes, but he contended that the written symbols had meaning for them only through association with the sounds that they had been taught to produce. He and teachers of the deaf before and since his time also try to have their pupils associate the sounds that they make (and that they must suppose others are making) with visible facial movements—in a word, to read lips.

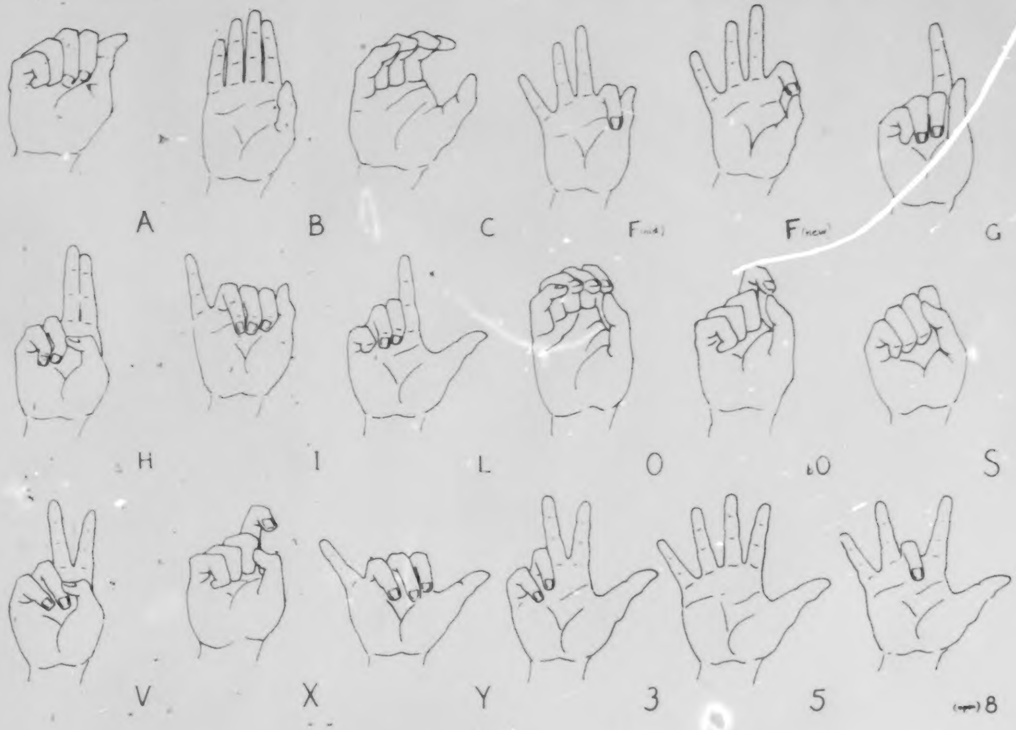
Language taught by these procedures is expressed in speech, but speech with a difference: receptively it is seeing the facial activity of persons speaking; expressively it is making the sounds one has been taught to make. This way of teaching is not marked by its success, as many compelling reports are pointing out (e.g. Denmark 1973, Conrad 1979). Yet various ways of using these procedures dominate American education of the deaf. Users of the "pure oral" method insist on postponing instruction in reading and writing until lip reading and voice production have been in use for some time. Proponents of the "natural method" do not teach language either analytically or synthetically but as situations arise in its use in a classroom of deaf pupils with a hearing, speaking teacher, not notably a natural environment. "The oral method" differs from these first two chiefly in that reading and writing instruction accompany instruction in lipreading and in making speech sounds. In theory, when any of these procedures is in use, there is nothing for the deaf child to see except for the lip and face movements of the teacher and other pupils. In fact, there is a wealth of information being presented to their eyes. Besides the inevitable gesticulation of the teacher (see Chapter 15), there are the teacher's other actions, the room itself, and all the objects in it, not to mention the activity of a handful or double handful of brighteyed children.

American educators of the deaf have gambled that all this and more information, of a linguistic kind, can be integrated and understood by means of spoken English taken in and interpreted from the visual inspection of a speaker's face. For a hearer and possibly for some profoundly deaf children spoken language (and all the nonverbal communication that surrounds it) does perform this function. Many readers will have had some interaction with a three or four year old hearing child and the spoken question "Why?" and the countless repetitions and variations on the theme. The child is asking for spoken explanation or verification of what the child's mind is constructing. But oral methods of teaching a deaf child at the preschool stage concentrate on getting a few syllables produced and lipread; and even after the child is in school, the expectation holds that in one full year the average deaf child will have gained a lipreading and speaking vocabulary of fifty words—fifty against the average five year old's five thousand! One wonders what the three year old deaf child thus educated is creating with his or her mind to compare with the why-asker's (again see Chapter 7).

The question is whether a deaf child's eyes and mind are being put to anything like efficient use in any setting that excludes sign language. It is this question above all other considerations that has turned attention back to the sign languages used by deaf people. Sign, American Sign Language, is directly related to the language of signs used by the generations of deaf people Épée and Sicard and their successors instructed in France. It is the language of deaf adults in North America and has been their language for more than a century and a half. It has been put to special uses recently by hearing persons where speech will not work: in noisy locations, in airless space, under water, and in communication with chimpanzees and gorillas. It is also the language in which most deaf persons who get a higher education acquire that valuable prize—not that the hearing teachers or the deaf teachers at Gallaudet College use ASL in formal instruction, though the latter may indeed use it in intimate tutorial sessions, but it is the language in which those highly educated deaf persons interact with one another and into which they translate anything of real importance (see Chapter 13).

The nature of a sign language. A sign language uses sight, as lip-reading speech also does, but uses it in a special way. Sounds—vowels and consonants along with differences in rate and intonation—are the elements of language received by the normal ear. What is "read" by a deaf person who has learned to do so is the position changes of the lips, teeth, and tongue in the act of producing sounds. But the elements of a sign language are actions seen exactly as they are performed. They do not divide air from the lungs into sounds contrasting as vowels and consonants. The elements of a sign language are actions that can be seen composed of two complementary but almost simultaneous aspects: what's acting, and what it's doing. One hand or both hands of a signer usually will be seen to act, but at this point in the study of sign languages it is not possible to say with certainty if the hands are major or minor actors in sign language. A signer's eyes, face, head, shoulders, trunk, and whole body also act to transmit sign language signals. It is certain, however, that when a hand acts or when both hands act, the arms as well take part.

Thus the first aspect, what acts, in a manual sign is recognized by signers because of what two sets of muscles have done. These muscles are (a) the distal muscles, which can open and close the hand, can extend, bend, and clench any finger, can spread or abduct two or more fingers; and (b) the proximal muscles, which can flex, straighten, and bend back the wrist, can bend or straighten the elbow, can rotate the forearm bones and can rotate and swing the upper arm. What these muscles are sensed to have done presents what acts (although it may be necessary to stop the action by fast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photography or in the imagination to see it). Examples below show a sign of ASL in capital letters spelling the word most signers accept as a near translation:

(1) The V-hand (index and second fingers extended and spread) on a supinated forearm with a sharply bent elbow is what acts in SEE;

(2) The V-hand on a pronated forearm with the wrist somewhat bent and the elbow sharply bent is what acts in some forms of the sign LOOK-AT;

(3) The V-hand on a pronated forearm, wrist bent, elbow nearly at right angles, and upper arm raised is what acts in (someone) WALKING.

The second aspect, *action*, also uses the same two sets of muscles, distal and proximal; but under this aspect what they *are doing* not what they have done makes the difference; e.g.

(4) The muscles of the extended fingers of the V-hand bend and straighten them repeatedly to make the action of the sign DOUBT, as in 'I doubt that';

(5) The muscles of the arm bend the wrist and make the elbow angle sharper to move the supinated V-hand back over the shoulder—the action of a sign that means 'reminisce' or 'look back on'.

In the earliest sign language analysis, the aspect *what acts* was treated mainly as hand configuration in a manually produced sign, and notation was taken from the American manual alphabet (Figure 1). The role of the arm muscles in forming what acts was represented in the notation by subscripts (e.g. $G_{\wedge}$ - index finger hand pointed up; B_{a} - the flat hand supinated; $\checkmark Y_{p}$ - the Y-hand with forearm pronated and the angle of the elbow acute). In the same treatment (Stokoe 1960), the aspect *action* was treated mainly as movement, and an additional specification, location (where action focuses) was made. Thus in *A Dictionary of American Sign Language* (Stokoe, Casterline, Croneberg 1965), a sign will be found listed in notation thus: $\mathrm{T}\,\mathrm{D}\binom{s}{s}^{(s)}$ —where T stands for *tab*, the location; D stands for what acts (but only as the hand configuration), with a subscript to show what the arm muscles have done (sometimes called orientation but without reference to muscle action); and ^{s} stands for sig, the action—two sig symbols on the same line indicate successive actions, one above the other indicate actions performed simultaneously.

The two complementary aspects, what acts and action, can thus be further analyzed—if activity is manual. A hand that acts is distinguished by configuration (or handshape) and by what the proximal muscles have done. (If the latter is called "orientation," the analyst is caught in the problem of relating the hand, the palm, a finger, which finger, etc. to the signer's body, the addressee's view of the signer, the three dimensions of space as seen by one or the other...) When it is a hand or both hands that act, action can be distinguished as motion and location. Hence, for manual signs a dez symbol and a subscript provide notation for what acts, and sig and tab symbols provide notation for action. When current and future research establish precisely the role of other than manual activity in sign language expression, it will be sufficient to consider simply what acts (e.g. the nose) and its action (e.g. wrinkles)

There is an epistemological and a biological basis for looking at gestural signs under two aspects—and for avoiding the loose, often misleading use of terminology and thinking that applies to analysis of the sequential production of language sounds. Human vision of something acting can render accurate information about the movement but requires the action stopped before detailed information about what is acting can be gained. The reason for this is that the retina of the eye has cells of two kinds: those adapted to tracking movement, and those adapted to resolving fine detail. Signers can tell us the exact configuration and angle of a hand in a sign because they know the language and are able to produce that sign; but watching either a live performance or a filmed or videotaped record of signing does not present enough actual visual information for any viewer to be certain about details of configuration at any instant.

Just as vowels and consonants are assembled in some orders but not in others to make syllables of English, the elements of Sign combine to make signs: some forms of what acts and some forms of action go together, others do not. Signs are considered to "have meanings" just as words are, but here some of the common misunderstandings about sign languages have their beginning. The usual notion, fostered by many English-to-Sign handbooks, is that a sign represents a word of English with the same meaning, and conversely that each English word "has a sign." The facts are different. The study of languages as systems complete in themselves has shown that no word for word translation of any language into another will result in grammatical output. Among signers a sign may have some of the meanings and uses of an English word used to translate it but not others. Likewise, a word may translate a sign as it occurs in some contexts but fail completely to translate its meaning in other contexts. This being so, the phrases and sentences of English and Sign may be even more different in structure than the words and signs of the two languages.

Here it is necessary to stop a moment and look more closely at the notion of languages as systems "complete in themselves." This idea is really a convenient fiction of linguists. Far from being complete in themselves, languages mingle with other systems at either end. At the meaning end, a language connects to everything in the world that its users do and say and think; at this end there is an interface between language and the user's whole culture. At the other end, the physical world of sights and sounds, the structures of language in order to get expressed must connect with some bodily mechanism to produce an output that sight or hearing can receive. For most of the human race, the primary output is speech sound and the input sense is hearing. For the deaf, a minority often estimated at about one one-thousandth of the total population, the primary output is bodily activity, also called gestural, gesticulational, motor, nonverbal, or mimic activity.

The notion of languages as "systems complete in themselves" also fails to describe languages in real life in all those instances when people, individually or in groups, use more than one language. Both in the larger, social sphere and inside the language habits of one individual, two or more language systems can mingle with each other and so lose their absolute completeness. The possibilities, however, when one of the competing or combining languages is English and the other is Sign are different from the situation when both are spoken languages. Signing activity and speaking activity can in some respects be carried on at the same time. Of course when that happens, the signing is not at all likely to be the output of Sign as a language system. Instead, the signing speaker, or an interpreter shadowing the speaker, will be using signs as code substitutes for the words being spoken.

Much of what is called sign language, and indeed most of what is taught in so-called sign language courses, is this kind of signing; in such uses signs are not a language but a word encoding system. Nor is this a precise code like fingerspelling, in which one hand configuration and only one stands for one letter of the alphabet. In word-encoding signing there is no one-for-one matching, but some word-sign pairs are familiar to all the deaf and hearing people who use them, while other words of English do not have familiar and unique sign representatives. When saying one of these less familiar words, the speaker or interpreter may then fingerspell the spoken word or may perform some sign usually paired with a word somehow similar in meaning to the one spoken.

This way of using signs as an encoding device is the entry point for most people who learn signs to teach or work with or converse with deaf persons. It has the advantage of being easily learned—as an expressive medium—because the learner does not have a whole new language to learn. The sign-for-word code can be memorized in a fairly short time, and with practice it enables the learner to make normal spoken utterances visible to deaf persons who have a reasonably good command of English at the encoder's level, and who also have practice in using this double output system.

Like Morse telegraphy and fingerspelling, the process of encoding spoken words as signs allows its learner to gain skill and speed in transmitting before any receptive skill can be developed. Unfortunately, many hearing persons who have learned it thus never do learn to receive signing from deaf signers with facility. All this is quite characteristic of secondary language codes. Learning a true language works the other way around: the learner gains the ability to produce grammatical phrases and sentences in the language being learned only some considerable time after gaining the ability to receive and understand what its users are expressing.

The latter process, learning Sign as a language, follows normal language learning patterns. Those hearing persons who do succeed in learning how to sign in a way approaching that of deaf native signers reach that level only after a long period of watching and understanding signers. Deaf people also, who move to a place where another sign language is in use, report that they spend much time watching and trying to understand what the others are signing before trying to make any sign utterances of their own in that language. (See Chapter 5) Moreover, interpreters, who very fluently encode the words of a speaker they are listening to, find it very difficult and anything but fluent to watch a signer and to put the Sign output into spoken English—the latter task is genuine translating, the former is secondary encoding. Much of the difference in difficulty for the simultaneous interpreter arises in this system difference.

System differences. When the two systems, English and Sign, are considered, the possibilities of difference in structure between something that is said in standard English and the same idea expressed in Sign have often been exaggerated and misrepresented (Tervoort 1968). It is quite possible for an expression in ASL to be exactly parallel to an expression in English, as we shall see. It is also possible for the constructions in the two languages expressing the same idea to be quite different. This has led some users of Sign as well as some of its detractors to claim that Sign is "ungrammatical" or has "no syntactical rules." Unfortunately this false notion, uncorrected by any real knowledge about language, is repeated in many textbooks used in training teachers of the deaf.

The signs in a Sign sentence may occur in the same order as the words in an English sentence, or they may occur in different order. A Sign sentence may seem to omit signs for words that are essential in the English sentence. Again, the Sign sentence may have signs for which the English sentence shows no equivalent word. Sign language grammar has its own rules as well as its own lexicon of signs with their meanings; and the rules and lexicon of American Sign Language differ from the rules and lexicon of English.

Seen as a whole system, then, Sign is quite like English or any other langauge. Its elements contrast with each other—

what acts and action in one sign with what acts and action in another; but the contrast is visible not audible. The elements combine in certain ways and not in others. These combinations, the signs, "have meaning" as words in other languages do. Constructions combining signs, like constructions combining words, express meanings more competely and complexly than can single signs or single words. These constructions or syntactic structures are systematic, rule-governed structures. There is a unique set of rules for making ASL constructions just as there is another unique set of rules for making standard English constructions, various non-standard English constructions, and the constructions of any language.

Before looking at the extreme differences that may occur between Sign and English constructions, we will look more fully into the possibility of similarity. One thing that makes parallel constructions in the two languages possible is the general agreement that many signs and words do form pairs for practical purposes (which include contact between deaf and hearing persons at least partly familiar with signs). Another reason that constructions signed may duplicate the order of constructions in English is really incidental to Sign as a language. There is a third way for language to be directly presented to sight, different both from the changing appearance of a speaker's face and from the different elements of signs. This third way is fingerspelling; it is usually closely associated with ASL by deaf signers in America, but it may also be used as a way of encoding English or any language written without using Sign at all (see Carmel 1975).

Fingerspelling works by virtue of the pre-existence of alphabetic writing. There is some evidence that its use—perhaps more for secret communication than for the needs of deaf persons—is as old as the practice of scratching, carving, and writing letters (Abernathy 1959, Stokoe 1974). When fingerspelling is incorporated into signing, differences between Sign and English grammar and vocabulary may grow less. Words that have no counterpart in ASL, like the, a, an, of, and the forms of be, are fingerspelled when the encoder wants to make the manual expression follow English rules more closely.

Fingerspelling also serves as an important link between the two languages for the bilingual American deaf person. New signs are coined, and many old ones have been, by using the manual alphabet "hand" as the configuration of what acts and moving it in a sign-like action. Thus the first letter of the borrowed English word becomes the configurational part of what acts in the new sign. Signs for days of the week, color names (except RED, WHITE, BLACK) are made this way, as are personal name signs and other signs.

To the linguist interested in grammar, English and Sign may seem to differ enormously because of their different transmission modes, but with the link fingerspelling gives, the deaf American signer shifts from one to the other (i.e. ASL and manually coded English) with ease. Two sociolinguistic distinctions need to be made, however. First, the deaf signer who is seen sometimes to use a sign, sometimes to fingerspell an equivalent word is likely to have reached a higher educational level than one who uses the sign only. Second, there are many signs the forms of which are derived from short frequently occurring English fingerspelled words, but these are not used by deaf persons in their conversation with hearing persons. These and the very interesting changes in form, meaning, and grammatical coding they have undergone are described by Battison in Lexical Borrowing in American Sign Language.

The conditions, then, under which a Sign sentence will preserve the order of an English sentence are: (a) the free use of fingerspelling; (b) the signer's and the sign addressee's competence in English; and (c) communication situations that call for the use of English-like signing instead of ASL. Such a situation may be the signed interpretation for a deaf audience of a formal lecture or may arise from the natural tact of a deaf signer conversing with a hearing partner who knows sign-encoded words but is unfamiliar with ASL structures. If the communication situation does not call for this kind of adjustment of the output to English-like structures, Sign sentences may show a wide departure from the patterns of standard English. Two examples of such divergence will be examined in detail.

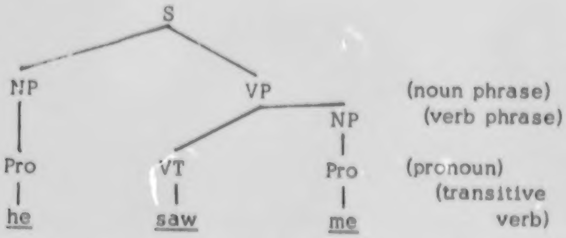
Surface similarity in Sign sentences.

The first example comes from one possible way of signing a simple and basic sentence in English: "He saw me." It is simple and basic because its syntax may be described by a small number of explicit rules. Leaving aside all explanation of meaning and the sound output of the English original, we may use three rules and a brief lexicon to generate this sentence's syntactic structure:

1. S → NP + VP
2. NP → Pro
3. VP → VT + NP

Lexicon
Pro: he (1st time),
me (2nd time)
VT: saw

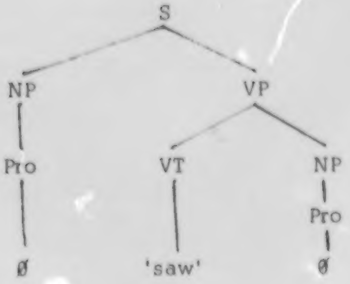
Below is a diagram of the structure these rules generate and the word string that results from replacing the symbols generated by the rules with lexical entries:



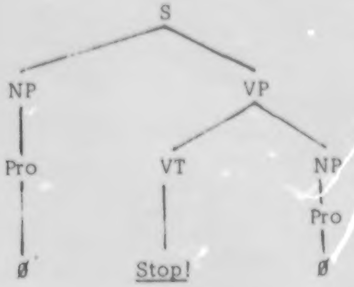
There should be no difficulty in reading this description by rule and diagram in terms of usual parsing: Rule 1 describes the structure as Subject followed by Predicate, and Rule 3 describes the predicate as Transitive Verb followed by Object.

The difficulty arises when the same sentence in Sign is put beside the English sentence or the English-like way of signing it. All that an observer will see is what manuals of sign language call one sign, but the sign is not one to be found in any of the manuals. The sign given for the meaning 'see' in sign language books is described something like this: "The V-hand, held up so that the fingertips are near the eyes of the signer, back of the hand outward, is moved away from the face a short distance." But instead of this, a signer who is expressing the meaning 'he saw me' in Sign holds the V-hand pointing obliquely out at about shoulder level (forearm supine, elbow near right angle, upper arm rotated outward), and while looking at it, bends the wrist sharply so that the fingertips point at the signer's own face.

Using the rules and diagram for this sentence, we are forced to observe that two of the three symbols are not given lexical entries!



This does not seem very satisfactory, although there is a sentence in English with something like this structure:



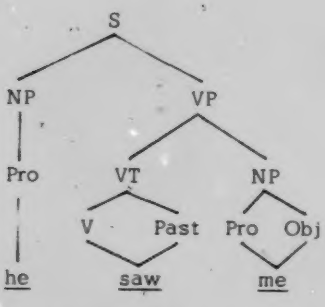
Speakers and hearers of English understand perfectly that "Stop!" may be expanded as "You stop" or "Stop that" or "You stop that"—any of which in fact may occur instead of the one word form. Thus, all four of these English sentences have the same underlying structure of the diagram, and all four share the meaning command.

In the case of "He saw me" spoken or written and its signed translation (at the top of the page), the utterer and the addressee understand: 'A masculine person, not either of us (but whom we both could identify were it necessary), saw me.' In the English version (or one fully fingerspelled), there are two other bits of meaning given surface representation. Saw has a form that indicates the seeing happened in the past; me redundantly indicates what its position in the string also tells, that it is the object. When an example like "He saw me" is used in a discussion such as this, we must suppose that the sentence was spoken in a situation in which the speaker and hearer both can indicate and understand all the meaning of he through glances of their eyes. (Just how much of this gesticulation or nonverbal communication is necessary for efficient communication in speech is another subject.) If we turn from speech to written English, we must suppose that the sentence He saw me has been taken out of a sequence of sentences that more or less exactly identify who he is. In the example from Sign the same kinds of supposition are needed. Because the Sign sentence translates into 'He saw me', the meaning 'past' must have come from some signed indication earlier in the signed conversation or narrative that a past time is being talked about. Although we can thus account for the element 'past' in the Sign sentence by the same explanation used to account for the reference of he in the English sentence, the problem remains, how does a signer make this one sign sentence mean 'He saw me'? The signer does so: (a) by a change in the way of producing the sign SEE (which in uninflected form also means 'I see' or 'seeing' in general); (b) by starting the changed sign SEE with the signing hand held where it would be held to make the sign meaning 'he' or 'him' or 'her'; and (c) by moving the signing hand's two extended and spread apart fingers by wrist action to point toward the signer's self.

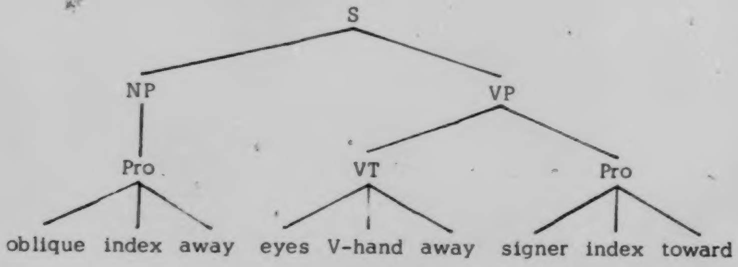
To sum up this comparison, or more properly this contrast, of Sign and English sentences more rules are needed. First, for the English sentence, tense and object-marking can be specified by rules:

1. S → NP + VP
2. NP → Pro (+ Obj, in context of VP)
3. VP → VT + NP
4. VT → V + Past

The lexical choice and the form change in the verb are now managed by rule instead of in the lexicon; thus, V becomes see; Past is rewritten as a vowel change, see to saw; and Pro becomes he (or him if obj) first time and I (or me if object) second time. But the structure changes very little, as the diagram on the next page shows.


S
NP
VP
Pro
VT
NP
V
Past
Pro
Obj
he
saw
me

This is still a simple structure, but the one-sign sentence in Sign is not exactly described by this tree diagram. To describe it requires more and different categories, as the next diagram shows:


S
NP
VP
Pro
VT
Pro
oblique
index
away
eyes
V-hand
away
signer
index
toward

If these elements at the bottom of the diagram are put together in a Sign way, the result is a three-sign sentence with the same order as in the English sentence, but the one-sign sentence that we have been considering can only be derived by transforming this structure. The elements, or aspects, of a sign occur simultaneously, as can be shown by writing them vertically, with the sign shown in capitals as a gloss below:

oblique	near eyes	signer	
index	V-hand	index	⇒
away	away	toward	
HE	SEE	ME	

The double arrow to the right indicates that a transformation takes place at the sign formational level: the meanings of each of the three signs are preserved, but after the transformation only the aspects shown below are visible:

oblique
⇒ V-hand
toward

HE-SAW-ME

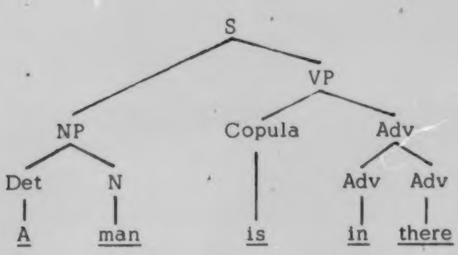
Other grammatical analyses of this sentence in ASL may be made, but two points should be quite clear from the analysis just made: (a) Sign has just as much regular grammatical structure as English; and (b) Sign sentences convey precisely as much meaning to one who knows Sign as English sentences convey to a native speaker of English. One point further: just as such emphatic productions as HE saw me! and He saw ME! and He SAW me! may have different meanings for speakers of English, so the Sign sentence can be varied, especially with head and eye movements and with modulations in the manner of the hand's action (see Baker & Padden 1978, Klima & Bellugi 1979).

Simultaneous major constituents in Sign sentences.

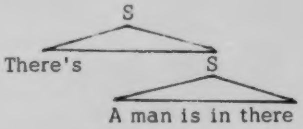
The second pair of sentences to be compared seems to show more complication of syntax on the English side. Grammarians who speak of generation of structures by rules and transformations would say that there is a base structure underlying the sentence There's a man in there and point out that a transformation of the base has made it what it is on the surface. They might write rules like the following to generate the base:

1. S → NP + VP
2. NP → Det + N
3. VP → Copula + Adv
4. Adv → Adv + Adv

These rules generate the structure shown in diagrammatic form on the next page:



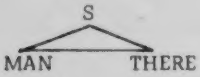
Various transformational rules have been proposed to derive a there-sentence from such a base as this. (Part of the educational value of this kind of grammar is the practice it gives the proposer of rules.) One proposal is to consider that there are two bases and that they are transformed by embedding one within the other. This requires the generation of another base: *There's something (The * marks the sentence as suppositious and non-appearing as surface expression.) Then the part represented by something is replaced by the whole original base structure. The rule for this transformation may be: Something ⇒ S. The diagram below shows the first stage in this embedding transformation:

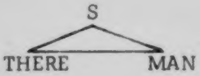


A deletion rule then effects the removal of the extra is to give: There's a man in there. The Sign sentence that "says" the same thing seems to be much simpler in structure. It uses only two signs, MAN and THERE (which is actually a pointing rather than a lexical sign). It has no determiner and no copula. Sign, like most of the world's languages, does not translate be overtly. In this sentence—which is one actually observed as the output of a signer in a specific situation—the sign that equates with the English adverb there means 'in there', because the signer was pointing to a closed door; the man referred to was not in sight. In English, a man there has to be translated as 'a man where you can see him too'. Thus the actual situation in which it is used determines whether this sign means 'there' or 'in there'. This is not an unusual way for a language and its situational meanings to relate.

Despite the absence of articles and copula, despite its having just two signs, the Sign equivalent of 'There's a man in there' is a difficult structure to describe in current linguistic terms. What makes it so is that the system of rules we have been using specifies the order of the elements as well as the nature of the elements (NP, Pro, or the words that replace them). But in the Sign sentence both the signs composing it, its two major constituents, appear at exactly the same time!

The rule, S → MAN + THERE, will not do, because any rule of the form S → X + Y means that Y must follow X, must appear later. Neither of the diagrams shown below can catch the basic structure if they also specify time order first-second by their left-to-right order:





Order has meaning in Sign of course as it has in all languages. The difference in ASL between YOU FORGOT and FORGOT YOU may be just like the difference if these signs are translated into English spoken words. Sign like English has XY and YX as possible orders in its syntactical system, but nothing in our normal or special conventions for writing can show the third kind of order that only Sign normally uses. If we write the elements one above the other as in fractions— $\begin{matrix} X & Y \\ Y & X \end{matrix}$ —the usual implication is that the upper element occurs before the other. We might try what looks like a typist's strikeover: **X**. But microscopic examination of this symbol might show which key was struck first. Two signs performed at the same time contain no clues to help one decide priority in time. A speaker of English might cry out, "In there! In there!" And a listener might respond: "What?" and get the answer, "A man!" With only this much context to go on, grammarians may argue that beneath all this excited talk lies the English language competence of speaker and listener, that this competence has quietly generated the base, a man (is) in there, and that two deletion rules have operated to produce the repeated first outcry.

Rules, however, of the usual deletion, substitution, combination, and permutation kind do not describe the Sign sentence

MAN THERE	or	THERE MAN.

The point is not that generative-transformational grammars are inadequate for Sign—"All grammars leak" is a common linguistic saying. No theorist of language has yet adequately described the way languages work inside their own systems, let alone the way they work socially, in human groupings. The point is instead that Sign, far from having no grammar, has such interesting structure and so unusual a system that it challenges all theories of grammar based only on spoken languages. The differences we have seen in just two pairs of sentences should warn us that everything we know about English, right or wrong, must be questioned all over again before we apply it to a sign language and what its users do with it.

Equally important is the fact that languages are much easier to learn and use than to describe or explain. Every spoken language used (now or in the past) has been learned and learned quite thoroughly by every child, bright or normal or dull, that is born among its users—provided of course that the child can hear it being spoken. Children who cannot hear learn sign languages in the same way if given the chance. Moreover, the elements of a sign language can with exposure and use become clear and understandable to anyone who can see. The combinations of these elements—what acts, its action, and its location if it is as moveable as a hand—are signs that have meaning for all who use the particular language the signs belong to. Having meaning, these signs can also be used to translate English words—but to translate them no better or worse than the words of any language can translate the words of any other. The combinations of these signs are used by signers to make sentences in Sign. Signers or nonsigners also may use the signs and others to make a reasonable facsimile of an English sentence. Therefore it is possible to encounter signing in which signs are arranged exactly as if they were words of a standard English sentence, but it is also possible to encounter signing mildly or wildly different from English yet still quite faithful to its own grammatical rules.

Social implications of a sign language. In the preceding section we saw that the structure of Sign sentences is sometimes like and sometimes unlike the structure of English sentences. Education of the deaf is both like and unlike American education in general. Of the latter William Labov has said, "...the fundamental role of the school is to teach reading and writing of standard English" (The Study of Non-Standard Dialects, 1969). But the schools that Labov looks at in the aggregate play their roles on the solid stage of language competence: a hearing child in America comes to school after four or five years of very intensive language learning and use. The child has the rules, i.e. the competence, to generate and understand countless sentences—which may be in standard English or in some non-standard dialect of English. Others might put it somewhat differently: the child has completely learned the sound sub-system by school age, is nearly done learning the inventory of grammatical forms and combinations, but is only well started on learning the whole semantic system of the language spoken in his or her environment.

Most deaf children probably will not have learned any of these subsystems of English. The school for the deaf child undertakes to teach literacy of course, but it assumes an additional role: to teach the child English so that it will be the child's native language. But hearing children learn English naturally; they do not have to be taught their native language (see Chapter 9). Language formally taught is either a second language or else something as unrelated to real language as the can/may distinction drilled into every American boy with negligible results.

What surprises linguists like Labov when they learn of it and shocks compassionate teachers like Herbert Kohl (1966) is that no school for the deaf uses a natural sign language to perform either the role of teaching literacy or the role of teaching English as a second language. Even in an era of "total communication" the usual school for deaf children allows a multitude of modes for expressing language structures—speech, signs, fingerspelling, cues, etc.—but only when "straight" or "correct" or "grammatical" English is the language in which the structures are generated. It would take too much time away from the study of sign language to go into the language teaching methods in use and the various rationalizations offered for not using Sign, which children of any degree of hearing impairment can see and quickly learn.

One of the most important uses of language is in the formation and preservation of social groups. The term group can be given its widest range of meaning, for language has critical functions in the intimate group of two persons (if we disregard the possibility that the smallest group is one person thinking), and language also has tremendous power in the largest possible groups: e.g. Western Civilization, The Free World, Socialist Peoples' Republics. If these last seem too large and remote to be convincing, one has only to recall the inclusive and divisive effect of just one word, black, as used in American society in the sixties.

The most notable outward effect of Sign is to make deaf persons using it immediately visible and visibly different. Conversely, not using it hides the deaf person from detection as different by a casual observer. An unreasonably high valuation put upon this effect has worked along with outmoded language and social theories to keep Sign out of schools. Nevertheless, this fact remains: those who cannot hear must use eyes instead of ears to receive language information, and in this respect they are very different from hearing persons.

Deaf people constitute a social group both by the difference of not hearing and even more by the social working of language. But this is grouping by separation from hearing, "normal," society; yet deaf people form groups as people of all kinds do, and in large part this is by the operation of language. Having a common language joins people by the strongest of bonds (see Chapter 5).

Using sign language, however, does not make a single and homogeneous group. Just as among users of any of the world's languages, there are all kinds of subgroupings also determined by language and its use. One of these subgroupings is that made by age and language (see Chapter 3). Children, teenagers, adults who use sign language are in far more complete communication within these and smaller age groups than across them. The case of infants is somewhat different, as in any language community. The fortunate among the deaf infants—from a language standpoint—have deaf parents and perhaps deaf brothers and sisters with whom sign language use puts them into perfectly natural communication at the earliest possible age. Once the sign language user moves out of infancy and joins a group of agemates using sign (and those who do not acquire Sign in the family become signers by joining such a group later), this user's language is that of the age group and stays so for a lifetime (see Chapter 13).

Another kind of grouping by language, found among speakers of all spoken languages, is typical of Sign users too. Persons of the same age group sign alike, except that those of the same sex sign more alike. Obviously there are physiological causes, such as vocal tract size, for the difference between men's and women's voices; but when the focus is language, not speech, the differences in vocabulary, grammatical structures selected, and every other part of the system can be observed. Here the observer who comes new to the sign language is at an advantage. One of the first impressions will be of the difference between the signing of men and of women, a difference that may also be attributed ultimately to physiological difference in skeletal structure. The reader may doubt that there is a similar difference to that of men's and women's signing among the speakers of English unless he or she has heard and noticed the difference in speakers of other dialects.

A third kind of grouping, a more precisely interpersonal relationship that language accomplishes, is done through style levels. Martin Joos calls these levels "the five clocks" in his book of the same name. As five clocks can be set to tell different times, so the style levels of language can be set, and are set, to tell different things of importance about the relationship of speaker to listener. These levels Joos names "intimate, casual, consultative, formal, and frozen." Consultative is the central norm with opposite tendencies. Consultative style joins two people through language use, despite their differences, because as Joos says, "two heads are better than one" for consulting about most subjects. The vocabulary, structure, manner of production, and information content of this style can be taken as standard for the language. In casual style, the next less formal, the language used implies 'we're friends', and therefore much information may be left out that has to be in place in consultative style. Also in casual style, slang is not only permitted but required. In the other direction, formal style treats the addressee as if he or she is not there—in fact the addressee is not able to reply when addressed in formal style by virtue of being one member of an audience to a lecture or of some other formal group. All the connections must be clear in formal style and every bit of information must be in place. Because interruptions are not expected or allowed, "careful" is the obvious characterization of formal style. Formal is the speaking style of course that comes closest to written style of the kind that gets published in formal works. Ironically, it is also the kind of English style that is often taught to deaf children despite its being one or two style levels away from what is most appropriate.

Two levels away from consultative, intimate style comes very close to being a contradiction to some familiar old definitions of language, because it is a social vehicle, a possession, shared only by those who know its special rules. Intimate style is private language. Husbands and wives, to take one kind of intimate group, have a special vocabulary known only to one another. It includes pet names, as many observers have noted, but it has other features as well; for instance, a clearing of the throat or a grunt or a word that would have no obvious meaning in other settings—things like these have more force sometimes in an intimate group than whole paragraphs of formal language could have.

Frozen style is the imaginative label Joos gives to the style of (good) prose and poetry. He does not call it "literary" perhaps because in casual or consultative exchanges we sometimes take the word literary to mean artificial or artsy-craftsy. Frozen may seem a chilly label for artistic language until we think of how our standard of eating has improved since the invention of frozen food processing. From his discussion of the level of frozen style, Joos launches into a description of literature, its nature, uses, and production, by actually creating some. This is also pertinent to the study of sign language and is of the utmost importance to every person who has contact with a deaf child.

Sign language is not written, but it has a literature. Careful language characterizes formal style, but artistic language, frozen style, has more than just care behind it. Many peoples whose culture does not include writing have songs, poems, dances, charms, histories, and liturgies that use frozen language style. Sign language users too have artistic forms of expression and themes to express in them. Two of the most intensively developed forms are fortunately accessible to non-signers. One is a union of Sign and modern dance in which signs seem naturally—but really with consummate artistry—to merge into the total movement of the dance. As in any artistic movement many individuals have made contributions to this art form, but much credit is due to the very early inspiration of two deaf signers, Carolyn Bateman and Colette Foley, and to their dance teacher Peter Wisher. The second Sign art form widely visible is Theater of the Deaf. To be seen on television and in national and international tours as well as in local deaf communities, this also is a natural-seeming development, from pantomime and from the pioneering of the Gallaudet Dramatic Club in the fifties and sixties. The "Director's Note" by Gilbert Eastman in the playbill for the Gallaudet College Theater's production of "Hands" in November of 1975 contains an excellent brief history of this development of the art of theater.

All five of the styles that Joos describes, then, are also found in the uses signers make of Sign, and recognizing them has tremendous importance for the study of sign language. First of course is the conviction that recognizing them brings: if a sign language, say ASL, works intimately, casually, consultatively, formally, and artistically, even as it unites and divides its users by age and sex, and as its structures come from its self-contained system—then surely it is a language of the depth and social complexity that only natural languages have and a language well worth study. Second, when its "frozen style" embodies artistic achievements that make (hearing) critics of drama and dance jump to their feet in applauding, then parents and teachers of deaf children need to realize that using signs in their own grammatical systems does not cut off the heights of intellectual and artistic achievement but opens new ranges to be surmounted. And third, for the study of sign language itself, the five styles are indispensable instruments.

Elizabeth McCall attempted in 1965 to explain the syntax of Sign in "A Generative Grammar of Sign." She writes phrase-structure rules and transformational rules to generate some sentences of sign language that she had observed in use. One problem in this work is that the signs themselves, the physical elements of signing behavior, are not described. Instead the sentences collected are recorded as sequences of English words used to translate the signs she observed. The use of Joos' five clocks would have prevented a more serious flaw. The signing was observed at picnics and other social gatherings of deaf persons. Those signing to each other were friends, fellow workers, immediate relatives, and intimates of one another—as is learned from McCall's introduction and from the internal evidence of the sentences themselves. It is a safe bet, then, if not a certainty, that the signing observed was all on the casual and intimate level, never even rising to the consultative; since persons not on casual terms do not go to such gatherings with each other, of if they do, as Joos points out, they stay on strangers' footing for a few seconds at most—the time for a formal introduction and one response. Therefore, since the characteristics of casual style are ellipsis and slang, and those of the intimate style are extraction (of information that the intimate already knows) and jargon, any attempt to write the grammar of ASL and its (partial) lexicon from the data collected is bound to describe something quite different from the standard (consultative or formal) language, the sign language that might be used to advantage in schools.

Indeed, the first two rules of the McCall grammar show more things left out (parentheses) than left in the base Sign structures:

$$1.\quad S \rightarrow \left\{ \begin{array}{l} G^{1} \\ (Adv_e) + (NP) + Pred + (T) \end{array} \right\}$$

$$2.\quad G \rightarrow \left\{ \begin{array}{l} (Adv_e) + G_1 \\ G_2 \end{array} \right\}$$

Using this same procedure would result in a much elided or extracted English sentence structure. Suppose an overheard conversation between husband and wife is transcribed by a writer of fiction:

"Dear?"
"Engh?"
"Checks."
"N't goin' that way."

After much study, a panel of experts on English as it is spoken

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[1] G, any gesture or sign used alone as complete utterance.

might translate the passage as follows (material in the parens is supplied to show what has been left out because the person spoken to already knows it):

> '*Dear* (are you listening; I want to remind you of something)?'
> '(throat sound for 'yes; I'm listening; what is it)?'
> '(I'm almost out of blank) *checks* (as you know, and you also know I do the accounts tonight. Would you please stop at the bank on your way to work and pick up some for me)?'
> '(I have to drive Charlie to the airport this morning, and I wo)*n't* (be) *going that way*.'

If we were to write rules to generate English sentences like those utterances transcribed on the preceding page, with parentheses to show what elements were left out, we might possible get a generative grammar of (intimate) English much like the first generative grammar of Sign.

Language and the community. Two other ranges that Martin Joos relates to the range of five style levels are those of *scope* and *responsibility*. A speaker or user of a language may be understood only by persons in a small isolated locality, in a wider provincial region, or anywhere the language is used. Scope widens then from local to provincial to standard, but it narrows to conservative or all the way to puristic. Education and variety of experience are usually the means of changing one's way of using language to standard; but personal preference usually accounts for later narrowing of scope, if it occurs. There is frequent reference among Sign users to other signers' "home signs" and much condescension in discussing these strictly local and provincial manners of signing. Ironically, the makers of handbooks and some teachers who teach signs to hearing adults (since children are usually not permitted to use them) miss the standard scope and take a conservative or even puristic attitude. Their description of the "right way" to make signs and put them together can depart in one direction from standard as home signers depart in the other. Of course standard is not a matter of legislation but of currency. When leaders of national organizations discuss standardization of Sign in, e.g. the National Association of the Deaf or the

Jewish Deaf Association, they are not trying to halt the tides of natural language change but only to recognize that there are local, provincial, standard, conservative, and puristic kinds of Sign, and to indicate that the signer who studies, practices, and uses standard Sign is on surest ground.

The second range Joos treats is responsibility. Just as in a person's way of speaking we detect character, so it is in Sign use. The smooth operator, the promoter, the born loser, the show-off, and all the other types that we instantly associate with a particular way of using language are all to be found in the signing community too. One does not have to be a native signer or an expert in sign language to recognize the general indications of character in sign language use. This kind of language difference is what Joos calls responsibility. We judge it of course by the way a person talks, looks, and acts, so that it is a language difference closely linked to many other indications of character.

Bilingualism in Sign and English. The constant use of two languages—bilingualism—may be looked at from either end of a sociolinguistic telescope. In the broad view, it is a complicated social and political problem, with a linguistic center and a very explosive potential when peoples of two language stocks must live under one government. It is also, if looked at closely, a very valuable skill of an individual person. The study of sign language requires looking in both directions. The deaf population of the United States may suffer the same irritation, frustration, even loss of basic rights and privileges suffered by members of other minority language groups. The deaf individual, however, faces a unique problem: one of the two languages to be used is not oral—the full definition quoted in part at the beginning of this paragraph reads: "Bilingualism is the constant oral use of two languages."

The broad social aspect of bilingualism has many facets when looked at worldwide. Canadian bilingualism involves two languages of high prestige, and the rivalry of French, British, and Canadian cultural values complicates the sociolinguistic situation. In other bilingual areas only one of the languages may have the prestige of worldwide use, while the other remains little known and perhaps is unwritten. In the past, obviously, the world language would become the one official language in such a situation, and the local language would remain the tongue of the governed classes. In the present world, however, it is possible to find the language of the emerging nation made official, and the world language reduced to secondary status.

These are but a few of the possibilities when languages are in contact, but for the deaf the pattern is still most like that of the colonial past. Sign language is not written, though now it may be. Sign is little known, either to the general public or to those whose professional study is language. Sign is excluded from official school and religious instruction—though it should be noted that several religious groups have been and continue to be its strongest supporters. For the deaf individual and population in other countries, the bilingual situation can be even less advantageous. Colonialism, imperialism, and racism—words that occur as often now in hot debate as in cool study—still summon up a social attitude that can be discerned in much official policy regarding Sign, ASL and other sign languages. Here, for example, are the words of a British royal commission to examine "the place if any of 'manual communication' in the education of deaf children" (emphasis added):

> Clearly the major risks associated with the use of a combined method which includes signing would be eliminated if the signs were themselves chosen from a systematic language with normal grammatical structure. (Lewis 1968)

The chairman of this commission later amplified his remarks in an address to teachers and others in Britain concerned with teaching deaf children:

> Everybody knows what is commonly said about signing, that it may impede, may retard, the development of language. I think there is some misunderstanding about this, if I may give my personal opinion. The notion is that signing is more natural, that signing is easier than the mother tongue [whose?]. Up to a point this is true, but if signing is to be a means of educating the children, the question is whether it is in the hands of teachers who understand what they are doing and have the skill to put it into practice; and how far the signing itself is linguistic. (Lewis 1969)

The commonly held notion that "the mother tongue" is the sole repository of "normal grammatical structure" is a concept well known to anthropologists, who have called it ethnocentrism. When ethnocentrism is used to deny that some other language is systematic and to impute to some out-group who use that other language a deficiency of mental functioning, this notion comes periously near to racism. The study of the grammatical systems of sign languages as well as their semantic and symbolic or expressive systems is the best way to replace such ethnocentrism and linguistic chauvinism with useful knowledge. To begin, one may read with profit the essays "The Linguistic Community" and "Sign Language Dialects" by Carl Croneberg in A Dictionary of American Sign Language (1965, 1976). More recently, several articles by James C. Woodward appearing in the quarterly Sign Language Studies show how all of these subsystems of language relate to the special social dimensions of the Deaf community. (See also especially Chapters 1 and 12 below)

Social bilingualism is important to understanding education of deaf persons in America, but the bilingual development of the deaf individual is crucial (for an excellent case study of such development, see Chapter 7). In truth, a deaf person faces more than the classic bilingual dilemma. The member of a minority language group has the choice of staying monolingual and so staying a second or third class citizen, socially and economically. Or if that person tries to shift to the language of the dominant majority, he or she may either succeed and shut off all background contact and incur social and psychic costs, or fail and be rejected by the dominant group, with equally serious consequences. Ideally, of course, one should grow up where one can learn and use both the languages with about the same amount of time for each. But that is a situation hard to realize.

The person who cannot hear does not even have these hard choices. The chances are ten to one against growing up in a family using sign language naturally, and so the deaf child must come to school age without knowing any real use of spoken language or of standard (or provincial but community supported) sign language. Even with sign language learned at home or from association with older deaf children, the deaf person cannot receive any formal education in this language, because schools and teachers, if not parents, reject signing.

Instead, this person will be taught in school to make sounds and perhaps to lipread them, to recognize and write letters, and even in exceptional situations, to fingerspell. All of this activity has an English language basis of course, and it is designed to make this person into a monolingual user of English. Early resistance or failure on the person's part to function like a native speaker of English despite profound hearing loss consigns the person to worse than a depressed social and economic status. Dropping out early, either by volition or through the "reassessment of learning aptitudes" in repeated psychological testing, consigns the signer to sheltered institutions instead of school.

Fortunately the good sense and adjustment to reality on the part of many members of the signing linguistic minority exceeds that of well-meaning officialdom. None or very few of those whose native language is Sign suppose that a monolingual life in a sign-using deaf community is an open option; although there was a short-lived movement early in this century to set aside some of the Southwest Territory to form a deaf state, which would have made the language of signs its official language. While the authorities in school try to force deaf children to function as monolinguals in a vocal-symbol language, wiser heads in the deaf community strive for a maximally effective bilingualism. The higher the level of competence in reading and writing English the deaf signer can attain, the better his life chances in the bilingual situation. Acquired speech and lipreading skill are highly rewarding assets that no deaf person despises. The deaf person does object, though, to a formal educational program that concentrates on the two "oralist" skills alone at the expense of all learning else. All evidence shows that reasonable proficiency in speech and lipreading is attainable by very few profoundly deaf persons, while for most even a dozen years of full-time effort brings only frustration and non-success. The extent of this non-success is fully exposed by Dr. R. Conrad's recent book, The Deaf School Child (1979). Meanwhile, the language competence in English that could have been fostered through bilingual use of the deaf child's Sign competence has been lost.

From the point of view of one who cannot hear, bilingualism can be more a challenge than a dilemma. Direct personal communication with one's friends will naturally be in sign language; one does not have the same kind of relationship with foreigners, and all speakers of spoken languages will in a sense always be foreign to those who must listen with eyes not ears. But consultative and formal participation with others is almost exclusively for the deaf person to be carried on in English, the language of the general culture and the language that affords the only way into that culture and all its benefits. Therefore the person who cannot hear will learn just as much English just as well as circumstances allow. Until now the circumstances provided by formal education have been less than optimal. The real issue is not oralism versus manual communication, as much time has been wasted arguing; instead the issue is whether the true bilingual situation of the deaf person—Sign and English is to be recognized.

The question to be faced by all who have a hand in shaping the life circumstances of deaf persons is this: will the deaf person reach maximum competence in English better if forced into apparent monolingual use of English or if the need for bilingual development is acknowledged and met? This question is a somewhat different way of looking at the old controversy: linguistics and sociolinguistics, that is, provide a way of saying not "one language or the other" but of saying "both." Linguistics as an anthropological science begins from the view of language as central in total culture. From that it follows that differences in the way people communicate, in the things that they do, and in their languages are taken as data to be studied and not as deviation, error, deprivation, primitivism, or degeneracy (All of these have in the long or recent past been invoked to explain the failure of the society to enculturate deaf people). Sociolinguistic studies have shown repeatedly that bilingualism, diglossia, and other intimate combinations of languages in the individual and in society are facts of life. From a sociolinguistic viewpoint the bilingual competence of deaf persons may be compound or complex; i.e. they may be more at home in Sign than in English or may be better in English than in Sign (rarely) or may be equally competent in both (also rarely). In contrast, the psychological model behind much current educational policy for deaf children treats deafness and the language of deaf persons as a pathological condition to be treated clinically.

Fortunately, some teachers' practice is better than their theory, but bad theory can corrupt practice. A teacher may understand a complicated statement, an explanation, or a request that a pupil presents entirely in Sign and may respond appropriately. Yet this teacher is all too likely to tell an observer that the pupil who has just communicated in Sign "has no language"! What we are to understand from this amazing statement requires careful explanation:

1. By "language" the teacher really means 'competence in English needed (a) to understand those sentences presented in the teacher's speech or in writing, and (b) to produce grammatical sentences in the pupil's own voice or writing.'
2. By "no language" the teacher means: '(a) the pupil's responses to written or spoken sentences are inappropriate or are lacking; (b) the pupil's production is not grammatical; or (c) both of these.'
3. By "has no language" the teacher implies that the pupil is as much out of place in his or her classroom as a two-year-old would be in third grade.
4. By using "language" as the token for 'correct English' and by not allowing "language" to stand for Sign, the teacher is guilty of falsely condemning the pupil to a subhuman, socially inferior status.
5. By the statement, the teacher is also unconsciously confessing and excusing failure—who could be blamed for not teaching anything to a child who "has no language"?

But such a teacher is still on the side of the angels. At least the pupil's communication in Sign may be responded to and understood adequately. What the teacher says and thinks about "language" are the residue of teacher-education courses and textbooks. That this teacher does not use Sign to address the pupil and to help pupils learn English and literacy is in most cases simply the policy of the school—to act counter to such policy is as much as many teaching positions are worth. Yet the study of sign language could free this teacher from the fear and ignorance that equate all knowledge and thought with a single language or dialect—from ethnocentrism.

Unfortunately, the teacher who can understand the pupil's Sign utterances is not typical nor even part of a substantial minority. The usual teacher response to the first appearance of a deaf child's signing is often such utter rejection that signing is ever afterward hidden from teachers. This does not keep the teachers from saying however that this pupil "has no language." Sociolinguistics could at least inform these teachers that even in a "one hundred percent American" community there are other languages than English in use and other varieties of English than the standard of the school. Teachers and others in special education programs who will become teachers of deaf children can find other benefits also in the study of sign language and in the findings of linguists.

The greatest obstacle to successful second language learning seems to be lack of opportunity. There must be a great many persons, among them teachers, who would like to know another language if only they could find someone to teach it and use it with them. The good fortune of finding a person one spends minutes or hours with every day to learn from as a native speaker of an exotic language seems remote. Nevertheless, most teachers of deaf children are blessed with such riches to the point of embarrassment. An older deaf pupil knows far more sign language (both vocabulary and structure) than any hearing teacher is likely to imagine. The pupil indeed has probably become extremely skillful in hiding this knowledge because of the attitude of the school and its teachers.

So, if a teacher of the deaf has a genuine desire to learn Sign, the problem is not to find someone who knows it but to persuade those who know it that using Sign is permissible and will not be punished overtly or subtly. A pupil who is at a loss and halting and inarticulate in English may be fluent, imaginative, even eloquent in Sign. Of course one who resolves to learn the pupil's language must first accept the fact that it is a language, must remain undisturbed by its differences from English, and must make the pupil-informant comfortable in the new situation. In some cases it may be easier to find an informant not in the pupil-teacher relationship. Many teachers in schools for the deaf can find a colleague (perhaps in the vocational department), a dorm supervisor, or another staff member easier to approach and to learn from. After all, learning the pupils' language requires of a teacher a difficult reversal of the normal roles, and some teachers may not be able to bend enough to learn. There are many references in the writing of deaf persons to the kind of response (often unconscious) from hearing persons that effectively and finally checks their attempts at speaking. The looks on the faces of those who are standing near when they venture to produce their version of hard-learned speech sounds are often mentioned in these personal histories. Just as clearly, the deaf person is quick to note the kind of effect his use of signs has elicited in a strictly oral school environment. The classroom teacher who is at least open to being convinced that sign language might be studied has only to be attentive, sympathetic, and encouraging. But such an attitude may go directly against the policy of the school and so needs to be carefully considered.

Classroom research and application. Once contact is made with a willing informant-instructor and a teacher is in a situation where the study of sign language can begin, progress can be rapid. Besides being in more direct communication with pupils, the teacher who learns to sign and understand signing and to be well disposed toward signs and signing can engage in research of a directly applicable kind. Contrastive study of Sign and English has barely begun as a formal linguistic activity, so that any teacher with a classroom of deaf children is able to anticipate the professional researcher. The first kind of contrast noted by everyone who encounters a new language is contrasting vocabulary pairs. What is the sign for this word? is a question asked hundreds of times by all who start out to learn a sign language. But the kind of information this question can produce has only very limited usefulness. If there were really a definite answer each time this question is asked, if there were to be exactly one sign and only one for each English word, there would be no sign language—only a simple one-for-one substitution code of signs to represent English words.

A more effective way to study contrasts may be put like this: If sign A and word Z each translates the other, what are the differences in the way that the word and the sign can be used? This question is open-ended. A complete answer asks for a full description of both languages. Nevertheless, much useful information can be discovered by asking it.

Take for example the word *to* and the sign *TO*: the third word in "from Chicago *to* New York" is equivalent to the third sign in FROM CHICAGO TO NEW-YORK. The sign here written as TO is made by touching one index fingertip to the other. However, in translating "He forgot to pay," no sign is used for the third word; HE FORGET PAY is perfectly grammatical standard Sign. It is also a Sign sentence that may be translated into English in various ways:

HE FORGET PAY

* Him forget pay
* He forget paid
* He forgot pay
* He forgot paid
He forgot to pay

The first is likely to occur when a hearing translator has an open or hidden animosity toward sign language and all who use it. The next three translations are more likely to occur when the translator is more at home in Sign than in English—the English native speaker in a billion or so patterns like this one has never failed to hear, and to produce, a /tə/ or at least a /t/ between the two verbs. The deaf translator may never have heard this very low energy manifestation of spoken English. The last translation, the only one in grammatical English, is the translation made by a person seeing the Sign sentence HE FORGET PAY in a context where past time has been indicated and having the capability, from study of sign language, to make a full translation out of one language into the other.

To return for a moment to vocabulary study: the contrast usually found between mutually translatable vocabulary items can be broken into more detailed questions—to which the teacher who studies sign language can apply answers at once. One thing to look for is a one-to-two pairing. Some of the signs in ASL need two words to translate them properly in English; e.g. SEARCH (the cupped hand circles in front of the signer's face) equates with English 'search for'. Conversely, some words of English need two signs for their translation; e.g. discuss goes into ASL signing as DISCUSS ABOUT.

No one has yet made a full study of these contrasting sets of singles and doubles; consequently the teacher of deaf children with a real interest in sign language is in a better situation for studying them than are most graduate students in linguistics. The teacher may also be the most important user of this kind of research result, just as this teacher's pupils are in line to receive the most benefit. Two-word to one sign and two-sign to one word pairings present obvious contrasts for anyone who is studying sign language; the bilingual deaf signer whose English proficiency is classed as "native" also finds these pairs clearly contrasting. But to deaf pupils in a classroom or doing homework, there is no such clear cut contrast between the patterns of one language and the patterns of the other. They will persist in writing "I searched the word in the dictionary" or "we discussed about Vietnam." Any experienced teacher of the deaf can list a great many more examples of mixups of these opposite kinds. The teacher who makes a study of sign language, however, will know how to take steps toward reducing the frequency of such pattern interferences and increasing the frequency of grammatical combinations that the pupils can produce. The algorithm here is a bilingual one; the teacher points out: "See here is the way that we sign it; but if we want to write or say it in English, we put in this word for these two signs (or we put in these two words for this sign)."

How much and how fast the English language production of pupils so taught will improve may be viewed optimistically or pessimistically, but there is evidence that simply having a teacher who knows and who makes known to the pupils that they are dealing with two languages not one will pay educational as well as social dividends. And something can be said in favor of actually having a teacher in two-way communication with the pupils. Another approach is to look for pairs of English words that occur in the same order in normal English usage but when translated may take the opposite order in Sign (e.g. plane reservation / RESERVATION PLANE). The same may be done for word pairs that cannot be separated in English but are used apart from each other in Sign translations, and vice versa.

Besides these syntactic contrasts, which are relatively easy to discover and deal with, there are other system differences between the two languages that need study. English has a unique tense system. Every finite verb in English must be marked for past tense or remain unmarked; sign language, however, does not use verb forms as indicators of time. Of course signers like everyone else must deal with time. Here too the classroom teacher is in a position to do front-line psycholinguistic research; e.g. How do children who use Sign deal with time while their understanding of time and sequence, their concepts for dealing with time, and their language symbols for the concepts are developing? The work of Piaget on children's growth in handling time, space, equivalence, proportion, and other matters is of use here, as is the application of it Hans Furth has made in his studies of deaf school children. Children must have reached a certain stage in cognitive development to treat such operations effectively in language, and Furth has found that this stage occurs at about the same chronological age whether the children are native hearer-speakers of English or born deaf and so used to using gestural instead of vocal signs for thought and communication.

To move from these syntactic contrasts to semantic differences, so common a matter as degree is treated in quite dissimilar ways in the two languages. The English speaker has command of resources of paralanguage and kinesics shared with other users of the same dialect. For instance, a speaker can say "Good!" and use intonation and voice features and facial expression and body gestures that will modify the effect of the word spoken in several ways. But in addition to these modifications, which are paralinguistic or "nonverbal", the speaker usually has a wide range of words similar but slightly different to choose among for slightly modified message. Instead of good, the speaker might have said: fine, right, ok, excellent, super, wonderful, first rate, etc. A different choice of word, equally with the use of paralinguistic and kinesic modifications, will alter the effect—it will also indicate style, scope, and responsibility. Then, besides, all the users of English that the speaker usually talks with are also in complete control (although the control may be outside their awareness) of both these scales of modification, the word choice and the nonverbal. Like the speaker these others with the same language habits know how to interpret the result of change along both ranges at once; e.g. to decide whether "Wonderful" with lower than normal voice pitch, falling intonation, and a grimace of resignation indicates a more or less negative reaction than "Good" spoken with false heartiness, speeded-up tempo, clipped resonance, and a frown.

In contrast with all of this is the sign language users' communication of similar ranges of meaning. The first and most striking difference is vocabulary size. Sign languages generally have many semantic areas covered by what appears to outsiders as a single sign; while the same or similar areas of meaning are covered by a number of different words of English. Everyone who first begins to study the communication of persons using sign language notes with surprise the great subtlety and precision of their interchanges. Sign language has no need for large numbers of closely related separate items of vocabulary, because one sign can be easily modified to express many degrees of meaning. Sincerity, intensity, interest, and other nuances are portions of meaning that a signer can use modulations of action to build into the production of a single sign. The size, speed, tension, precision, and duration of the actions involved in sign performance are variable at will yet rule governed; and all are used and understood as message-bearing fractions of the visible signal. But most of this is outside the awareness of sign users, just as speakers need not think consciously about the tone of voice or the gesticulations they are using as they speak.

What has just been hinted at—the different manners of "making signs" and signs themselves—is certainly expressed in the way that one uses in speaking of languages generally. Looking at facial expressions, timing, size, and other features of signing as variable elements of "making a sign" has already proved useful as an alternative way of speaking of signing. A particular facial expression or eye movement or tempo change might not have occurred without a specific accompanying manually made sign, but it still might have a definite grammatical role in expressing meaning. In this case, the facial action or manner of performance would be similar to a spoken language grammatical feature, say the -s of English, which does not occur except with a word, but which may make a noun plural or may mark a non-past verb used with gender-marked subject.

The contrast between English and Sign vocabulary size and function finds a rough analogy in two mechanics' toolboxes. One has a complete set of wrenches, each of a fixed size to fit just one different size of bolt head or nut the mechanic expects to work with. The other has just one adjustable wrench, which will open wide enough for the largest and can be made to fit anything smaller. But this contrast of English and Sign needs more study. In fact it would be best to treat it as a hypothesis; the testing of its truth by observing sign language and English in operation is research that any teacher working with deaf pupils may undertake. Here too the opportunity to apply what one finds out is large. Those pupils who are adept at conveying to each other finely shaded meanings have real semantic skills and may prove to be apt learners, if they are shown how to put the same message in standard English. This can be done once the teacher has worked out the full details of the contrasting patterns. For the teacher engaged in this contrastive study there are several accessible materials in the classroom: what the pupils are saying to each other is by all odds the most interesting of all possible material to them. What the lesson is about, what Dick said to Jane, what the teacher is trying to say—these things do not come near in pupil interest to what the pupils are signing to each other. One real objective of the study of sign language is the ultimate ability of the teacher to take part in the real, intimate, vital communication of deaf children, and after that to impart to them all the knowledge and experience and understanding that a teacher has to contribute, and to show the pupils that what they have to say and know how to say in Sign may be put into English that is appropriate also to their messages.

Interesting as sign language is as a system, tantalizingly like other languages and fascinatingly different, the real value to be found in the study of sign language is a human, not an abstract scientific value. Every language is unique, but the study of sign languages reveals that language is both abstract, independent of speech and of gestural expression, and biologically concrete because of its expression. Language depends on the human brain, not on the naked or the electronically assisted human ear.

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PART ONE

WHAT IS SIGN LANGUAGE?

More than three-quarters of the way through the twentieth century it has become almost impossible to be educated and yet to hold opinions of the kind that were prevalent in print and in lecture halls as late as the 1950's. Sign language is not a way like writing to represent English or another spoken language for the eyes, although sign language elements can be so used. Sign language is not a simple multiplication of the kinesic or gesticulational behavior by means of which speakers of all languages supplement their vocal utterance with emblems, batons, illustrators, pointers, emphasizers, and other "nonverbal" activity. Sign language is not a universal language with rules of grammar and a lexicon instantly and without learning available to anyone so unfortunate as to be in a situation where no spoken language will work. And most emphatically sign language is not a grammarless collection of vague, approximate, yet concrete symbols used by persons lacking in the power of abstract thought or other cognitive skill.

All these baseless charges have until recently been leveled at sign languages used by deaf people. None are worth detailed rebuttal; instead, the reader will find in the next six chapters that the authors have much more interesting information to impart than that slanders of sign language and its users stem from ignorance at best or from a vested interest in maintaining a profitable monopoly on hearing and speech.

A brief introduction to Part One has already been sketched in the Preface, but the question that this part addresses is so large that some further indication of its scope may be helpful. The six chapters range from the specific sociolinguistic process called pidginization to the general linguistic and semiotic nature of encoding information into sense-perceptible output (Chapters 1 and 2); from the age-specific variety of American Sign Language (ASL) that children and young people use to the human universals of wit and humor in (here signed) language expression (Chapters 3 and 4); and from the realities of sign language differences across political and cultural boundaries to the detailed grammar of part of the ASL verb system (Chapters 5 and 6).

PART ONE: 1

PIDGIN SIGN LANGUAGES

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Introduction. The study of pidgin and creole languages has offered many insights into the nature of language, especially language as an observably dynamic phenomenon. Like most linguistic studies, studies of pidgins and creoles have concentrated on spoken language codes, but because the transmission channel used directly influences the surface form of the language output, natural gestural language codes, which are not dependent on vocal language codes, have expanded our knowledge of the nature of language. Pidgin sign languages can also serve as ideal testing grounds for the ideas of universality and uniqueness in languages, because code structures of such pidgins are relatively unexplored and because the diverse channels of the languages that are pidginized heavily influence surface code structure, especially in the phonological component.

This paper will concentrate on one pidgin sign language, Pidgin Sign English (PSE) to discuss: (a) an overview of the language situation in the Deaf community; (b) sociolinguistic reasons for the existence of PSE, including social functions of and attitudes toward PSE in the U.S. Deaf community; (c) linguistic characteristics of PSE, especially suprasegmental features; and (d) the relationship of these matters to a dynamic theory of pidgin and creole languages.

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The Language Situation in the U.S. Deaf Community

Sign language diglossia. Language is a cohesive force in a deaf community as in most communities, but the language situation in the U.S. Deaf community is similar in many ways to a special language situation called "diglossia." Stokoe (1970) first wrote of diglossia in the Deaf community. Using Ferguson's classic paper (1959) as model, Stokoe defined the public or H variety of signed language in use as Manually Coded English (MCE), and the domestic or L variety as American Sign Language (ASL). MCE used with or without a spoken or voiceless show of speaking is a combination of manual signs and fingerspelling intended to represent spoken English word for word; e.g.

(1) I went TO the STORE (signs in CAPS, fingerspelled words expanded)

If all the words in (1) had been fingerspelled, as they might have been, the result would be what is known as the Rochester Method or sometimes as Manual English. ASL, however, is a language in and of itself. ASL has a different grammatical structure from that of English. For example, the English question, "Have you been to California?" (composed of Auxiliary, Subject, Verb, Locational prepositional phrase), is translated into ASL as,

QUESTION
(2) TOUCH FINISH CALIFORNIA YOU

(composed of Verb, Auxiliary, Locational noun, and in last place, Subject and Question simultaneously presented).

In the article cited (Stokoe 1970) MCE and ASL are seen to pattern sociolinguistically like the H and L varieties respectively of a language in a diglossia. H is used in more formal situations and with more formal topics and participants. L is used in less formal situations. H is generally felt to be superior to L by the users, and some will claim that L does not exist; i.e. they will tell outsiders that L is not a language or is a "broken" language or a "short" language. L is generally acquired in the home, H in the formal educational system. H is generally studied in school as part of the curriculum; L is not. Much formal grammatical description has been made of H (English), but usually not much research has been done on L (this is especially true in the case of signed varieties). Some signers feel that standardization is necessary, but sign language diglossia appears as stable as other diglossic situations.

One major difference between diglossia in the U.S. Deaf community and other instances of diglossia is the manner in which the language varieties are acquired. In typical diglossic situations L is learned at home from parents and siblings and H is learned later in school. But fewer than ten per cent of deaf children have deaf parents to learn signing from, so that the typical pattern is not followed. However, if we consider that the home is the initial locus of enculturation for hearing children, while the residential school has served as the initial locus of enculturation for many deaf children of hearing parents, this difference is seen to have a sociolinguistic explanation. We can now say that L generally is learned in the initial locus of enculturation. The deaf children of hearing parents learn ASL from their peer-group deaf children who do have deaf parents or from older deaf children already enculturated into the Deaf community. The acquisition of ASL takes place always in informal situations. English (spoken or written) is learned so far as it is learned in formal classrooms, and MCE may be used there, but more often it too is excluded from the formal educational setting, at least in the earlier grades.

This diglossic situation is not the typical diglossia, for the language varieties H and L described by Ferguson (1959) are varieties of one language. However, Fishman (1967) extended the definition of diglossia to include the situation in bilingual communities. Fishman pointed out that it is possible to have diglossia with bilingualism, diglossia without bilingualism, bilingualism without diglossia, and neither bilingualism nor diglossia. The relationship between ASL and English is thus diglossia with bilingualism—as is the case with Guarani and Spanish in Paraguay (Fishman 1967).

More recently several researchers have added to the definition of diglossia by pointing out how H may be determined in a community and by the notion of a language continuum. Meadow (1972) and Stokoe (1973) showed that for some signers a formal variety of ASL may serve as H. While we have no exact knowledge of which groups of deaf signers use a form or variety of ASL in formal situations, we can hypothesize that the members of them are probably deaf themselves, have deaf parents, and learned signs before the age of six (or that their closest associates have these characteristics). Woodward (1973a,b,c, 1974) has shown that these variables predict which signers function nearest to "pure" ASL in informal situations.

It is also possible that some signers use special varieties of manually represented English for informal conversations. This would probably be true of those signers who function primarily near the English end of the diglossic continuum, as will be explained.

The Sign-to-English continuum. The notion of a language continuum in the Deaf community was first pointed out by Woodward (1972). Varieties of ASL were seen to be at one end of this continuum—which as Stokoe (1973) suggests, probably is multidimensional; with varieties of Manually Coded English at the other. Woodward (1973d) also demonstrated that intermediate varieties along this continuum had the linguistic and sociological characteristics of a pidgin language and called these varieties Pidgin Sign English (PSE). Battison, Markowicz, and Woodward (1973) and Woodward (1973a,b,c,d, 1974) have shown that variation along this continuum is nondiscrete, but regular, rule-governed, and describable in terms of modified scalogram analysis (Guttman 1944, Bailey 1974, Bickerton 1972) as well as by use of variable rules (Fasold 1970, Labov 1969). The variation in language choices made by ASL signers also correlates with gross social variables: whether a person is deaf, has deaf parents, learned signing before the age of six, and attended college (Woodward 1973a).

Sociolinguistic Background of Pidgin Sign English

The Deaf subculture. Formation of a Deaf community, a special subculture, resulted largely from two patterns of behavior, the attendance of deaf children in special residential schools, and the use of sign language by these children (Croneberg in Stokoe et al. 1965

[1976]: 297-312). Barth (1969) suggests that ethnic groups should be viewed as a form of social organization, in which membership is determined both by self-identification and by identification by others. Residential schools for the deaf provide the environment in which most deaf children "begin to develop feelings of identity with the deaf group and to acquire the group attitudes which tend to set them apart" (Lunde, in Stokoe 1960 [1978:22]). After leaving school, the deaf person continues to associate socially with other deaf persons, both informally and through formal organizations (Schein 1968; Stokoe, Bernard, & Padden below pp. 295-317).

Barth states that ethnic group boundaries specify patterns of behavior and social relations within a group as well as between interacting groups. Membership in the same ethnic group "implies a sharing of criteria for evaluation and judgment" (Barth 1969: 15). On the other hand, for individuals on opposite sides of an ethnic group boundary there exist different criteria for judging values and performance, and interaction is restricted to common areas of understanding and interest. Restricted ability to communicate with hearing people thus accounts only partially for the fact that deaf people prefer the company of other members of the Deaf community to that of outsiders, as hearing persons almost invariably are. Membership in the Deaf subculture is not strictly limited to the deaf, because it includes hard of hearing persons and hearing children of deaf parents (Furth 1963), at least until outside forces enculturate them as hearing (Nash & Nash 1978). In these cases it is clear that inability to communicate with hearing persons is not the principal criterion for membership in the Deaf community.

With regard to the claim that deaf signers constitute an ethnic group, Meadow states:

> The group definition is strengthened further with the knowledge that deaf persons are characterized by endogamous marital patterns. In the survey of the deaf population of New York State, for example, it was found that only 5 per cent of women born deaf, and about 9 per cent of women who became deaf at an early age, were married to hearing men.
> (Meadow 1972: 20)

It should be pointed out that not all the women in the survey cited by Meadow were necessarily members of the Deaf community, so that the percentages for marriage across the ethnic boundary may actually be even smaller.

The first school for deaf persons to survive and set a pattern for residential schools was established with Thomas H. Gallaudet as its head, in Hartford, Connecticut. Laurent Clerc, a deaf native of France who had been highly educated by Sicard and taught in the original National Institute in Paris, became the first teacher in the Connecticut school. There, as well as in similar schools which soon began operating in other states (most of them with Clerc's aid and advice), a variety of sign language served as the medium of instruction. [Harlan Lane, in an address at Gallaudet College on 19 February 1980, identified Clerc's variety as the methodical signs of Sicard and Épée—a kind of manually coded French—modified so that it did the like for English.] The language of signs and these schools flourished "to the point where a national college for the deaf was deemed necessary and established by Act of Congress in 1864 for the higher education of the graduates of these schools" (Stokoe 1960 [1978: 9]).

Functions of language in the Deaf community. ASL has served three primary purposes in the Deaf community: (a) communication on the interpersonal level, (b) socialization of the individual into the Deaf subculture, and (c) identification of members of the subculture. In all three functions, ASL acts as a powerful cohesive force in the Deaf community (Croneberg op. cit., Meadow 1972, von der Lieth 1978).

The Deaf, in many national communities, flourished in the 19th century; however, in 1880 an international conference of teachers of the deaf meeting in Milan passed the following resolution:

> The Congress, considering the incontestable superiority of speech over signing *in restoring the deaf mute to society*, and in giving him a more perfect knowledge of language, declares that the oral method ought to be preferred to that of signs for the education and instruction of the deaf and dumb. (Quoted by Denmark 1973: 285, emphasis added)

As a result, sign language in the schools was abandoned in the U.S. as well as in European schools, and the oral method of instruction replaced it. Nevertheless, ASL in some variety has continued to be used by pupils of American schools, but until recently not "in school"—thus ASL for a long time has been an "underground" language.

Cokely and Gawlik (See Chapter 3) show that the language of deaf school children differs, in some regular ways, from that of the adults in the Deaf community, perhaps because of the limited contact between the age groups. With the exception of a very small number of deaf teachers of deaf children, deaf children of deaf parents are the only cultural brokers between the adults and children in the community. Upon leaving school the young deaf person joins the adults in the subculture, adopting then the community's linguistic standards. ASL has continuously remained the language of the Deaf community where its use cannot be ruled or legislated against by outsiders.

The acquisition of a spoken language by a person who is born profoundly deaf presents difficulties of such magnitude that only a small minority has been found to have achieved competence in English as demonstrated by writing (Furth 1966). Among deaf persons competence in written English ranges from the totally incomprehensible to (for a few) fully native skill. With few exceptions, English remains a foreign language for a deaf person.

Interaction between the Deaf and English-speaking communities. Members of of the Deaf community tend to associate socially within their own ethnic group. On the other hand, they have formal relations with those outside the group; e.g. parents, teachers, doctors, speech therapists, counselors, psychologists, religious workers, and employers. In spite of the fact that the deaf person feels a complete and competent member inside the community, in encounters with outsiders he or she may be treated as a pathological individual. Membership in a minority culture is ignored, nor does the outsider know of the existence of that culture with its own rich language. Instead the deaf person outside the community is viewed as a defective hearing person.

Unfortunately for deaf persons, their schools are controlled by hearing outsiders. The school opposition to ASL may find some of its basis in the empirical tradition, with its contemporary manifestation in behaviorism, which equates vocal (miscalled "verbal") language with thinking (Markowicz 1972). A psychological explanation has been suggested by Vernon (1972), who bases the rejection of ASL by hearers on the inherent linking of signing with nonverbal communication, because signing makes the signer's deep feelings, of aggression, sexuality, etc., more apparent in social intercourse than does speaking. The imposition of English at any price on the deaf child and adult can also be seen as an attempt to impose the cultural values of the dominant majority on the members of a minority group.

Development of PSE. Pidgin Sign English has developed as a result of this cultural clash. Communication is necessary for the interaction that necessarily takes place between deaf people and those hearing people who come into contact with them through the professional activity of the latter. This situation is reminiscent of the commercial relation between Europeans and natives of other lands. According to Barth (1969), the interaction between members of different ethnic groups is so structured as to retain the boundary that separates them. To maintain the integrity of the deaf subculture as well as that of the dominant hearing culture, two rules promote the use of PSE as the medium of communication between deaf and hearing people: (a) within the Deaf community sign language diglossia accounts for the use of the H variety, i.e. PSE, as the correct form with outsiders; and (b) the dominant culture requires the use of its own language (or an approximation if the real thing is not feasible) in order to maintain its dominance.

PSE may be learned at almost any age by a deaf person, but there are social restrictions on who learns PSE at what time of life. Although fewer than 10 per cent of the deaf population has deaf parents, only a tiny proportion of the deaf parents are highly educated and competent at a native or near native level in English. In this tiny minority, PSE may be learned along with ASL from infancy (see Williams, Chapter 7, Pt. Two). In this situation, PSE may be incipiently a creole language; i.e. what a pidgin often becomes when passed on from one generation to another. For the majority of deaf children of deaf parents, however, it is more likely that PSE will be a second language, learned from interaction with hearing people and educated deaf people in formal, i.e. English-mediated, situations.

Until recently the majority of deaf children of hearing parents were not formally exposed to any variety of signing until high school age. It was believed by those in charge of their education that signing in any variety would inhibit the development of speech production; all research studies, however, show the opposite (e.g. Stuckless & Birch 1966, Meadow 1966, Moores 1972). Deaf children of hearing parents picked up ASL from deaf children of deaf parents, because ASL is preferred for informal conversations and children, by definition, have informal conversations. PSE was then later learned in some high school classrooms. Thus until recently, for the majority of deaf persons, PSE has been a second language, as is normally the case with a pidgin.

At the present time, the use of PSE is generally limited to formal occasions. For most deaf people signing in PSE only remotely approaches the H variety on the diglossic continuum described by Stokoe (1970) and Woodward (1972). As the signing approaches PSE, the grammatical features of ASL are replaced by such English features as grammatical markers and word order. The loss of ASL features sometimes decreases redundancy in the system without any compensation from the introduction of spoken language features. For example, the loss of suprasegmentals, which in ASL are expressed by facial expression and body movement, cannot be replaced by English suprasegmentals such as intonation, stress, and accent. PSE is no doubt sufficiently complex for communicative purposes, but it lacks the integrative and expressive functions of a natural language (Smith 1972). The deaf choose ASL over PSE as a vernacular language despite the low status of ASL in educational circles.

It is sometimes claimed that PSE allows the deaf person to acquire English in a normal manner. This is like claiming that knowledge of a spoken English-based pidgin is equivalent to competence in standard English. What the Deaf community members classify as PSE when signing among themselves often remains somewhat incomprehensible to hearing signers fluent in the H variety (MCE) of signing. Transcripts of signers conversing in PSE make clear that whatever their competence in ASL it is not competence in standard English.

Some Linguistic Characteristics of PSE

This section will present some grammatical and formational (phonological) characteristics of PSE. Because of the comparative recency of linguistic interest in PSE (since 1973), the account cannot be complete, but reductions and hybridizations that characterize many pidgin languages have been noted in PSE. Because of the wide variation already observed in PSE and because of the complex nature of the Sign-to-English diglossic and bilingual continuum of which PSE is a part, many of the linguistic characteristics are here stated in terms of relative tendencies (i.e. not that so and so is true of PSE and not of ASL, but that it seems to be more often in one than the other). The appearance of these tendencies have been found to correlate with social variables in the case of those grammatical characteristics that have been studied in some depth; i.e. verb reduplication, negative incorporation, and agent-beneficiary directionality. It is probable that the other constructions discussed are also implicationally ordered and correlated with social variables.

It should be remembered that PSE comes from two quite different languages—ASL, a language channeled through the gestural-visual modality, and English, a language channeled through the vocal-auditory modality. Deaf signers who learned signs before the age of six and especially those who have deaf parents, come from ASL backgrounds. Those signers will retain more ASL structure in their PSE. Hearing signers approach PSE usually with an exclusively English base; but because PSE is channeled through the gestural-visual modality like ASL, hearing signers cannot carry as much of their native language into PSE, since linguistic information (especially formation of units, phonology) from a vocal language cannot be directly carried by a gestural-visual channel. As a result, the hearing person's PSE suffers much more reduction in structure than does the deaf person's PSE. There is about the same amount of reduction of English structure and admixture for both hearing and deaf signers' PSE; however, deaf PSE signing includes much more ASL redundancy than does hearing PSE signing. In fact hearing signers of PSE may in acquiring PSE learn none of the manual and other than manual activity that gives ASL its normal language redundancy.

Grammmatical characteristics of PSE: a. Progressive aspect. In ASL the progressive aspect is represented by reduplication in the sign verb—all or part of the action of the sign is repeated; see Fischer & Gough below, Chapter 6. Verb reduplication in varieties of signing along the Sign-to-English continuum is ordered implicationally; i.e. the presence of one reduplicating verb regularly implies the presence of one or more others or of none in a signer's language, depending on which verb it is (Woodward 1973b). Table 1 shows the implicational relationship of nine ASL verbs in six lects (patterns into which a number of individual signers' language knowledge and performance falls). Lects 6 through 10 in Table 1 use verb reduplication in fewer environments and are characteristic of PSE.

	Lects:	1	2	3	4	5	6	7	8	9	10
	MEET	+	-	-	-	-	-	-	-	-	-
ASL	MEMORIZE	+	+	-	-	-	-	-	-	-	-
	SEE	+	+	+	-	-	-	-	-	-	-
Verbs	WANT	+	+	+	+	-	-	-	-	-	-
	STUDY	+	+	+	+	+	-	-	-	-	-
	READ	+	+	+	+	+	+	-	-	-	-
	KNOW	+	+	+	+	+	+	+	-	-	-
	RUN	+	+	+	+	+	+	+	+	-	-
	DRIVE	+	+	+	+	+	+	+	+	+	-

Table 1. Implication in verb reduplication in ASL (and PSE).

For the progressive aspect, MCE also makes use of a PSE sign for uninflected copula, or uses inflected forms of be plus a main verb, to render standard English be + ing. PSE, however, drops the redundant -ing. Deaf persons, persons with deaf parents, persons who learned signing before age six, and persons who attended some college all use more verb reduplication than do persons who do not have these characteristics; e.g.

(3) ASL: HE DRIVE DRIVE DRIVE [with reduplication
PSE: HE BE DRIVE DRIVE DRIVE transcribed as the
repetition of the
Eng: He is driving whole verb sign]

(4) ASL: LESSON HE MEMORIZE MEMORIZE
PSE: HE BE MEMORIZE the LESSON
Eng: He is memorizing the lesson.

b. Negative incorporation. Several verbs in frequent use in ASL may be made negative by action within the performance of the sign itself; this negative component is a bound, outward twisting movement of the active hand or hands from the place where the sign is made. Verbs that undergo this transformation are also implicationally ordered. Table 2 shows the implicational ordering for five of these verbs (Woodward 1974). Half of the lects shown, 4 through 6 in Table 1, tend to show PSE characteristics, with negative incorporation used in fewer environments.

Lects	HAVE	LIKE	WANT	KNOW	GOOD
1	+	+	+	+	+
2	-	+	+	+	+
3	-	-	+	+	+
4	-	-	-	+	+
5	-	-	-	-	+
6	-	-	-	-	-

Table 2. Implicational patterning of negative incorporation in ASL verbs (and PSE in lects 4-6).

Surveys of signers show that deaf signers use more negative incorporation than do hearing signers.

(5) ASL: ME $\overline{\text{KNOW}}$
PSE: I $\overline{\text{KNOW}}$
Eng: I don't know

(6) ASL: ME $\overline{\text{LIKE}}$
PSE: I NOT LIKE it
Eng: I don't like it.

c. Agent-beneficiary directionality. ASL has a large number of verbs that express the relationship between agent and beneficiary by direction of the signing hands' movement. The hand(s) that form the sign begin at the agent (or at a point in the agent's direction) and move toward the beneficiary. Although directionality may be used for all three persons, only second person agent-to-first person beneficiary use of directionality has been studied in a dynamic framework. Verbs that may take agent-beneficiary directionality are also ordered implicationally. Table 3 shows the ordering of nine of these verbs. Again approximately half of the lects, 6-10 in the table, represent more PSE-like signing. Some of the verb directionality characteristic of ASL has been retained in PSE, but most of it has been lost.

Lects: Verbs	1	2	3	4	5	6	7	8	9	10
FINGERSPELL	+	-	-	-	-	-	-	-	-	-
HATE	+	+	-	-	-	-	-	-	-	-
HIT	+	+	+	-	-	-	-	-	-	-
FORCE	+	+	+	+	-	-	-	-	-	-
SAY-NO-TO	+	+	+	+	+	-	-	-	-	-
ASK	+	+	+	+	+	+	-	-	-	-
TELL	+	+	+	+	+	+	+	-	-	-
SHOW	+	+	+	+	+	+	+	+	-	-
GIVE	+	+	+	+	+	+	+	+	+	-

Table 3. Implication in ASL (and PSE, 6-10) verbs that undergo agent-beneficiary directionality change.

Deaf persons, persons who learned signs before age six, and (deaf) persons who attended some college are more likely to use directionality than are hearing persons, persons who learned signs after age six, and (deaf) persons who attended no college. Examples:

(7) ASL: SHOW PSE: YOU SHOW ME Eng: You show me
(with inward movement for 'show')

(8) ASL: HATE PSE: YOU HATE ME Eng: You hate me
(moves in) (moves out: citation form)

d. Copula. ASL does not have a copula. PSE used by older persons has an uninflected sign as copula—the same sign as ASL TRUE. More recently several new signs to stand for English forms of *be* have been developed for use in the contrived MCE systems. Some of these new copula forms have been accepted by users of PSE, especially the younger users. The presence of past tense copula forms in a user's PSE implies the presence of present tense forms; e.g.

(9) ASL: GOOD HE PSE: HE BE (= TRUE) GOOD
Eng: He is good

(10) ASL: DOCTOR HE PSE: HE IS A DOCTOR
Eng: He's a doctor.

e. Perfective aspect. ASL has a marker for perfective aspect in a verb phrase; it is the ASL sign FINISH. PSE also makes use of FINISH. In PSE the verb follows FINISH and remains uninflected (contrived MCE codes may have a sign for the *-en* ending of English or use the same sign indiscriminately for past tense and perfect participle). For example,

(11) ASL: HE EAT FINISH PSE: HE FINISH EAT
Eng: He's eaten.

f. Articles. ASL does not have an article system like that of English. PSE has variable use of articles that is probably conditioned by environments. For older and less educated users, articles appear to be used with less frequency. PSE has a sign for English *a/an* (10) and fingerspells *the*. The limited data that we have on written Deaf English shows use of *the* more often than *a*; however it should be remembered that if Deaf English (Charrow 1974) is a written analog of PSE, it approaches standard English more closely than signed varieties normally do, and so it should not necessarily correlate with signed varieties of PSE. The variable use of constructions in written Deaf English and in conversational signed PSE may be quite different quantitatively and possibly qualitatively as well.

g. Number incorporation. In ASL numbers are often incorporated into pronoun signs (e.g. WE-2, signed with K-hand which has two extended fingers upright; THEY-3, signed with 3-hand). Most signers use numbers from 1 to 5 for incorporation, although some may incorporate higher numbers. There are probably restrictions, e.g. environments, on the incorporation of higher numbers. Some deaf signers of PSE may incorporate 1 and 2 in their signs, but most PSE signers do not incorporate higher numbers into pronouns.

Selected phonological characteristics of PSE. Because PSE shares a number of the phonological characteristics of ASL, and because readers may not be aware of some of the recent research in ASL phonology, we have included a short summary of the research done by Woodward and Erting (1974).

There is a level of sublexical structure in ASL analogous to but not dependent on the phonological components of spoken languages. In preliminary structural analyses of ASL Stokoe (1960 [1978], 1965 [1976]) showed that sign phonemes (there called "cheremes") could be categorized in three major aspects: tabs, the places where sign action occurs; dezes, what acts in a sign; and sigs, the actions or movements made by the active element. Bellugi (1972, Klima & Bellugi 1979) using short-term memory tests found that sign phonemes were processed by signers in the same way as phonemes of spoken languages are processed by hearing speakers.

There is no previous research on the phonology of PSE. Battison, Markowicz, and Woodward (1973) have discussed certain gross overmarkings in artificial MCE systems (such as Seeing Essential English, Signing Exact English); however, this overmarking is a result of poor language planning and does not appear in PSE, a natural pidgin language.

The limited data we have viewed on PSE phonology suggests an interesting relation and interaction between channels and codes (Hymes 1964, 1968). PSE is channeled through the gestural-visual modality as is ASL. This channel cannot carry vocal phonological information directly, nor can the vocal channel carry gestural-visual phonological information directly. PSE, because it is channeled through the gestural-visual modality, like ASL, has many more of the phonological characteristics of ASL than of spoken English. PSE handshapes are basically the same as ASL handshapes. PSE tabs and sigs (locations and actions) and suprasegmentals are somewhat reduced in the PSE of deaf signers and are greatly reduced in the PSE of most hearing signers, for these have little or no knowledge of ASL.

Influence on PSE from English phonology appears to be limited to fingerspelled words and initialized signs, i.e. signs with a dez handshape more or less exactly that of the fingerspelling handshape for the letter which begins the English word. The influence from English phonology is thus quite indirect, since English phonology reaches PSE only through the intervening medium of spelling. Influence from English vocabulary, however, is another matter; fingerspelled words are borrowed and become changed in many ways into signs of ASL (Battison 1978).

PSE handshapes. PSE retains all of the handshapes used in ASL and does not have any additional handshapes not found at the phonetic level in ASL. Because of the influence of English phonology on initialized signs in PSE, the pidgin sign language makes some distinctions at the phonological level that are not made in ASL: A, T, S, G, and D are distinctive handshapes in PSE at the phonological level. These handshapes are distinctive in ASL only on the phonetic level. Examples,

(13) ASL: TRY (using either *a*-like or *s*-like form of A-hand)
PSE: ATTEMPT (using A-hand)
PSE: STRIVE (using S-hand)

(14) ASL: TALL (G-hand slides up palm of B-hand as tab)
PSE: TALL (identical with ASL)
PSE: DEVELOPMENT (D-hand makes same action on B-hand)

Although ASL has initialized signs (some of which go back *mutatis mutandi* to French SL)[1] and therefore shows some influence from English phonology, there is considerably more use of initialized signs in PSE than in ASL. For this reason there are also more signs using marked handshapes (e.g. R-hand and T-hand) in PSE than in ASL (cf Boyes 1973, Battison

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[1] E.g. For 'blue' (*bleu*) a B-hand is vibrated in ASL and FSL; for *jaune* FSL shakes the j (i) hand; 'yellow' uses Y-hand.

1974). Relative markedness of R-hand and T-hand has no relation to English phonological marking, but only to the relative overall complexity of these handshapes in comparison to the other handshapes of ASL. The R- and T-hands require crossing of fingers, which is more complex than the other actions, such as extending or bending, that compose a handshape. Chinese SL does not appear to have either R- or T-hand in its native signs. Moreover R-hand and T-hand are learned comparatively late by children acquiring ASL from parents (Boyes 1973, McIntire, Chapter 8, below).

Although a number of signs using these relatively marked handshapes have been introduced into PSE, natural phonological processes seem to be leveling out some of the markedness. For example, many signs made with R-hand are being produced with the thumb extended (Woodward & Erting 1974). Phonetically similar handshapes like G and H have also been found to be undergoing the same (historical) change (Battison, Markowicz, & Woodward 1973).

PSE locations & actions. Although ASL handshapes are not reduced in PSE phonology, locations and actions are. Deaf signers of PSE tend to keep a good deal of ASL phonology intact in location and action; however, the actions are generally made smaller than in ASL, and the locations tend to be moved toward the central region of the body. Frishberg (1975) has pointed out that centralization is one strong process in ASL phonological change over time. She states

> The center of the signing area seems to be the hollow of the throat. Signs move down the face, in from the side of the body, and up from near waist level. (Frishberg 1975: 701)

The tendency toward centralizing the locations and actions of signs is seen in extreme form in hearing signers of PSE. Their signing space is limited as much as possible to the area from just above the eyebrows to the upper chest. Lateral movement is restricted even more, so that hands only rarely move beyond the shoulders.

While centralization is a natural historical process in ASL, and probably in other natural sign languages as well, extreme centralization is viewed negatively by a number of deaf persons in the ASL community. Some ASL singers have a derogatory sign for those who sign with extremely restricted location and action; the sign suggests an analogy with the habit of mumbling among speakers.

Suprasegmental phonology in PSE. "Intonation" is distinctive at the phonological level in ASL; i.e. in true sign languages like ASL, facial expression serves a function analogous to intonation in spoken languages. A change in facial expression, for instance, can convey a change of an ASL sign string from a statement to a question (Stokoe 1960 [1978: 69-77]). In PSE the use of facial expression is much restricted. Deaf signers who use PSE will use facial expression more than will hearing signers, who are often said to sign without expression.

In PSE facial expression is not distinctive at the phonological level, as it is in ASL. Changes from statements to questions are signalled in PSE by an English question word-sign, by English word order, or by a question-marking sign at the end of the question. Facial expressions may accompany these devices, especially among deaf signers, but the use of facial expression alone to signal a question is not found in PSE. Similarly, other ASL facial, head, eye, or body movements may be used by deaf signers in PSE—e.g. negation with head or facial action alone; but these are not characteristics of PSE and do not make distinctions at the level of phonology. It must be remembered that English intonation cannot be directly conveyed in PSE because of the incompatibility of the gestural-visual channel to carry such vocally produced information.

PSE and written Deaf English. Thus far PSE has been discussed only as a language variety put into expression by signing. Charrow has suggested that written (non-standard) Deaf English is PSE's "written analog, but is closer to Standard English in the continuum" (1974: 56). Because of the limitations imposed by the writing channel, Deaf English cannot express certain purely ASL constructions such as directionality in three dimensional space. There is a great deal of grammatical variation in the Deaf English Charrow studied, and also "elimination of number, gender, tense markers and other essentially redundant features" (1974: 50). Such constructions in Deaf English as the variable use of articles and copula forms indicate further similarities between Deaf English and PSE.

Along with the restriction and admixture in grammatical structure characteristic of DE, there goes a socially restricted use and an apparent lack of registers. The apparent lack of registers may be more an effect of the limitations imposed by the writing channel than of the pidginization process. PSE, while socially restricted, appears to have registers based on degrees of formality. This variation, however, may occur more for those whose use is more characteristic of a creole (i.e. learned as an infant from older users) than of a pidgin signed English. At this time it is impossible to know the exact relation of PSE to written Deaf English, but Charrow's hypothesis deserves further investigation.

Pidgin Sign Languages and Linguistic Theory

In the preceding sections we have discussed some of the sociological and linguistic characteristics of PSE. The variation and dynamism observed in PSE is describable in terms of recent developments in Variation Theory (Bailey 1974). PSE, while having some unique salient characteristics of a signed language (e.g incorporation, directionality), appears also to have characteristics considered substantive for all pidgins (Samarin 1971); these include reduction (ibid.) and admixture and restricted inter-group use (Hymes 1971).

Reduction & admixture. Reduction of grammatical and phonological characteristics of ASL and English and their admixture can be seen in all the grammatical and most of the phonological characteristics discussed above. One exception is that PSE handshapes are phonologically more complex than ASL handshapes. Reduction and admixture can be seen as paralleling the simplification found in pidgins of spoken languages. Reduplication of words and the use of a copula and a verb to represent progressive aspect can be found in several spoken pidgins. Implicationally ordered variation of these constructions would be as expected in a vocal as in a gestural pidgin.

Other reductions and admixtures appear to be a result of incompatibility of vocal and gestural channels and not of the usual working of the pidginization process. This seems especially true of phonology. English suprasegmentals cannot be carried in a gestural-visual channel. Thus there is more reduction and less admixture in phonology than in grammar, as we have seen. Deaf PSE signers are able to keep suprasegmentals, but hearing PSE signers cannot keep English suprasegmentals (nor for that matter segmentals) because of channel incompatibility. Hearing signers cannot utilize ASL suprasegmentals—usually they do not know they exist—because they are effectively culturally isolated from the deaf community. This situation appears to be unique to pidgin sign languages arising from contact between a natural sign language and a spoken language.

Restricted intergroup use of PSE. Hearing signers, unless they are children of deaf signing parents, will undoubtedly prefer English (in spoken or signed expression) for all types of communication. Most deaf signers prefer and use ASL for communicative, integrative, and expressive interaction with other deaf persons. Interaction between hearing persons and deaf persons is often limited to a purely communicative level. Different (sub)cultural values and beliefs as well as language differences hinder if they do not utterly bar any integrative and expressive interaction between members of the two groups. Deaf people are prevented from total integration with hearing society not only because of their inabilty to hear but also because of the predominantly negative attitude of many hearing people toward any disability. Conversely, hearing people are often prevented from acculturation in the deaf subculture because of language differences as well as the diglossic situation, which ensures that most deaf persons will move or shift towards a signing variety more like English immediately on discovering that a person is hearing, even if the person has been signing to them in ASL. Besides this language situation there is a strong feeling of group solidarity in deaf communities. This solidarity, which is often coupled with a distrust of hearing people, is extremely hard for an outsider to penetrate.

PSE allows communication between the deaf and the hearing groups, but perhaps more importantly it helps the Deaf community maintain its identity by not allowing extensive integrative and expressive communication between members of the two communities across the boundary. This language barrier thus helps to prevent significant intrusions of the dominant language community's values and language patterns into the Deaf community.

Although Woodward (1973d) stated in an earlier study that PSE might be short-lived as a number of other pidgins have proved to be, it appears that this prediction is erroneous in the light of the discussion above. ASL helps the individual deaf person to maintain identity as a member of the deaf subculture. PSE fosters development of the subculture, providing means for beneficial contact with, but preventing long-term cultural interference from, the hearing community. With such a vital function to perform, it is extremely doubtful that PSE will disappear, unless a better means can be found for the maintenance of cultural boundaries and therefore promulgation of cultural traditions.

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PART ONE: 2.

ENCODEDNESS and SIGN LANGUAGE

Clifford F. Abbott

Everyone knows what a language is. Most people have one in working order before they even start school. And since everyone knows what language is, it should be possible to determine the principles that underlie that knowledge. But to come up with a clear-cut, precise definition of language is something of a problem. Clearly we would want that definition to distinguish language in particular from communication in general. There are many systems of communication or ways of conveying meaning, which we metaphorically call languages; e.g. body language, the language of flowers, the language of art. But they are not really true languages like English, French, or Chinese. Many previously proposed definitions of language are lists of criteria for judging if a given communication system is a true language or not. Duality of patterning, the possibility of metalanguage, a way to express temporal relations, and other features or traits are often included in such lists. These definitions are useful for distinguishing, for example, a body language as a communication system from Greek as a true language.

There are, however, grey areas where we are less sure of that distinction. Suppose A and B are in a room and B is sitting next to a closed window that he could open. If A says "It's hot in here," then under normal circumstances two things have been communicated: (1) A has made a comment on the relative temperature of the room, and (2) A has made a request for B to open the window. The first communication was surely done by the English language, but was the second communication part of that language or part of a separate communication system? This second kind of communication is typical of a whole range of meanings that linguists and philosophers have labelled 'pragmatic' as opposed to 'semantic.' There is currently a debate among linguists as to whether pragmatic meaning should be incorporated into linguistic descriptions.

In certain situations a raised eyebrow can communicate a lot of information. It is a good example of body language, really a non-language communication system. Again, if the situation is appropriate, a certain tone of voice can convey the same information as the raised eyebrow—information, incidentally, that may not be easy to put into words. Is that tone of voice then part of the grammar of its user's language, or is it like the raised eyebrow, part of a separate communication system? The situation is even more perplexing when we consider that in some languages the relative tone on which a word is pronounced is very much a part of the grammar. In Chinese, for example, a different tone may change a word meaning 'blue' (high rising tone) into a word meaning 'lazy' (low-dipping tone) (Chao 1968). Yet in other languages such changes in lexical meaning are impossible with tone changes. Even within a single language like English, the kind of phonological juncture used around relative clauses distinguishes restrictive from non-restrictive clauses, while the same junctures elsewhere have no such semantic effect.

Tones of voice, junctures, and prosodic features generally, where they signify various nuances of attitude rather than concrete semantic differences, are often labelled paralinguistic. Like the pragmatic features, these paralinguistic features are part of that grey area between language and non-language communication (Lieberman 1973).

Among many people, especially non-signers, there is confusion as to whether sign languages are true languages or are non-language communication systems. There is by no means as much agreement on the classification of sign languages as there is on the classification of English or of body language. Part of the reason for this is the heavy use in sign languages of the very same mechanisms that serve most people for pragmatic and paralinguistic systems. Ultimately, the answer to the question "Are sign languages real languages?" is less important and less productive than the way in which we attempt to answer the question.

This paper proposes a different kind of measure or question. Instead of seeking a criterion of language, let us look for a measure of how language-like, or linguistic, any part of a communication system is. Not all parts of English are equally linguistic; the same is true of sign languages. If we have a measure for how linguistic a feature, a construction, a level, or any other part of a communication is, then we have a more insightful answer than saying "Yes; sign languages are languages;" or "No; they are not."

The basic processes of language are encoding and decoding. A semantic message is encoded into a form suitable for transmission, e.g. speech, and then is decoded into the same or an equivalent semantic message. In non-language communication the message is either delivered holistically (a yellow rose means the sender is 'jealous' in the "language" of flowers), or is simply enciphered unit for unit (each letter has a unique representation in the cipher of semaphore or morse). The guiding principle then is that the more encoded a message is, the more linguistic or truly language-like the system encoding it must be. To illustrate the measure of encodedness, let us first look at a paradigm case, determine the features which characterize that case, and then try to find analogues of those features in other parts of the structures of the English Language and American Sign Language.

The paradigm case we will examine is the speech code. There are a number of reasons for choosing this particular part of language as our paradigm. First, we know more about the encoding and decoding of speech than we do about the other levels of language, primarily because those other processes are less observable than speech. Another reason is the specialization of speech to language. On the encoding side, there is some evidence that the anatomical evolution of the human vocal tract has resulted in a shape that produces a larger repertoire of sounds (than the non-human vocal tract) at the expense of some more obvious survival features; e.g. it is easier for a human being to choke today than it was for Neanderthal man (Lieberman et. al. 1972). And on the decoding side, it is now clear that the perception of speech sounds in speech context is quite different from the perception of other sounds (Liberman et al. 1967). It seems then that both the production and the perception of speech have become specialized to facilitate language. The assumption being made here is that whatever the particular characteristics of the speech code are, they are likely to reflect more general principles of language, since the speech code has so clearly accommodated itself to language.

The paradigm case. The task of the speech code is to convert a string of phones (consonants and vowels) into a succession of sound waves. Traditionally the former is represented in a phonetic alphabet and the latter by plotting of sound frequencies over time (usually resulting in a pattern of bands or formants). One might expect a fairly simple and direct relationship between the phones (or the phonetic level) and the formant patterns (or the acoustic level); i.e. ideally each phone would have one and only one corresponding pattern of formants. If the phonetic and acoustic levels were connected by such a direct relationship, it would not be a code at all, but a simple cipher, a one-to-one matching. The actual relationship, however, is much more complicated. It is indeed a code, or if you will, a grammar (Liberman 1970, Cooper 1972). We can isolate at least the following four characteristics of that coding: (1) *context conditioned variation,* (2) *categorical perception,* (3) *parallel processing of information,* and (4) *abstractness of signal.*

Context conditioned variation. The first simply means that the code matches up different elements in different environments. For example, the phone /b/, a voiced labial stop, is matched up with one formant pattern in the syllable /ba/, with another in the syllable /bi/, with another in the syllable /bu/, and so on. In each of these syllables, if the formant pattern for the vowel is removed, what remains of the acoustic signal is not a single formant pattern identifiable as /b/, but instead several different patterns. In other words, an element of the phonetic level, in this case the phone /b/, is encoded into one of several varying patterns on the acoustic level. Which of these variants is chosen is a function of, or is conditioned by, the environment or context, in this case the following vowel. So the first characteristic of the speech code is that it produces context conditioned variation in its output.

Categorical perception. If context conditioned variation complicates the encoding of speech, categorical perception is the process that simplifies the decoding of speech. It is essentially our built-in key to decoding speech, so that when confronted with one of the context-conditioned variants of /b/ our very perception of it classifies it into a single category with the other variants of /b/. As a result, we hear one sound for /b/ regardless of the actual acoustic differences. We cannot hear those differences. This is rather amazing, for there is no such thing as categorical perception in our hearing of non-speech sounds. If we are presented with a gradually changing musical tone, we recognize and hear the gradual change; but if we construct, artificially of course, an acoustic pattern gradually changing from the acoustic signal of /pa/ to the acoustic signal of /ba/, then we perceive no gradual change—only the two categories of sounds /pa/ and /ba/.

Parallel processing of information. Another prominent feature of the speech code is the parallel processing of information. Since the acoustic pattern for /b/ has a unique variant if the vowel /a/ follows, it stands to reason that this pattern supplies information not only about the /b/ but also partly identifies the following vowel as /a/. In general, the cues for decoding will be scattered throughout the syllable, the normal unit of encoding in speech; and the cues for the several phones in a single syllable are transmitted in a parallel, overlapping fashion.

Abstractness. A fourth characteristic of the speech code is abstractness. The form of the acoustic pattern and the ways in which it can be modified bear no direct relation to its meaning and the ways in which meaning can be modified. There is no inherent link between any sound and any meaning in speech (onomatopoetic words being possible exceptions); and varying any acoustic parameter (e.g. loudness, pitch) does not result in a corresponding change in some semantic parameter. It is thus not a characteristic of language coding for a word meaning temperature to mean 'hot' if said loudly and 'cold' if said softly and degrees between if said with moderate force. The elements of encoded language are abstract in the sense that they are removed from such correspondence with their expression in the real world.

All these characteristics can be directly and objectively observed in the coding of speech, our paradigm case. By using these characteristics as our criteria, it should be possible to determine which parts of English and which parts of ASL are highly encoded or highly linguistic, and which parts are less encoded. First, however, it should be pointed out that even in the speech code itself not every element is as highly encoded as every other; i.e. not every element shows the characteristic features of encodedness to the same degree. For example, pure or steady state vowels (those without on- or off- glide) are far less encoded than are consonants; they show less variation in different contexts; they can be perceived more continuously (like non-language sounds) and less categorically; and they can be transmitted alone without any other sound segments. If encodedness is a measure of linguistic structure, we can say that these vowels are less linguistic than the consonants. Some of the prosodic features of speech are less encoded still. Emphatic word stress, to take one example, is a relatively unencoded prosodic feature. It is not conditioned on context, since the way speakers stress any one word is not particularly different from the way they stress any other. Their perception of stress is not categorical. One might claim that there was parallel transmission of information because in order to use emphatic stress one needs something to use it on, but this is rather vacuous parallelism, because almost any sound one can make is stressable. Finally, emphatic stress is not very abstract—the amount of stress is more or less directly correlated with the meaning of emphasis. Emphatic stress is one of the features that often serves a paralinguistic function and it is important to note that though part of every language it is relatively unencoded.

Encodedness in English. One feature of English grammar that is highly encoded is the subordination of relative clauses. The first indication of their encodedness is the context conditioned variation. The conditions on the syntactic transformation of relativization provide evidence of this. One condition on the choice of relative pronoun involves the position of a preposition. If a preposition precedes the relative pronoun, which is a possible choice as in (1), but that in (2) is not; both are permitted as choices in (3) and (4), where the preposition does not precede:

(1) the school from which I graduated
(2) *the school from that I graduated
(3) the school which I graduated from
(4) the school that I graduated from

Another condition involves a semantic element of the head noun (the word to which the relative pronoun refers). The forms who and whom require that the head noun refer to an animate being; which generally requires an inanimate head noun; and either is possible with that:

(5) the man	whom	I saw yesterday
	*which	
	that	

(6) the building	*whom	I saw yesterday
	which	
	that	

This latter condition is a kind of grammatical agreement, which can be taken wherever it occurs as a sort of context conditioned variation.

Still another indication of the encodedness of relative clauses would be their categorical perception. There is little direct evidence on how we perceive whole clauses, and it is commonly held that we perceive and process language in smaller segments. Nevertheless there is evidence from repetition tasks that clauses with the same meaning have a psychological sameness regardless of their syntactic form. When asked to repeat a sentence under certain noise conditions, a subject may frequently offer the sentence in an altered form, but with the original meaning preserved. As for parallel transmission of information, relative clauses are more clearly encoded. A relative pronoun carries information that the following clause is subordinate and often also information as to the role of the noun phrase deleted from the dependent clause. In the clause itself, the deletion site provides cues for the same information. And the abstractness of a relative clause is obvious, because there is no continuous way to modify its form and so create a corresponding modification in its meaning.

Contrast the highly encoded relative clauses just considered with a rather unencoded simple main clause such as

(7) John kissed Mary.

Here the context conditions no variation. The information is presented in three discrete elements without overlapping (subject, verb, object), and presumably that is how we perceive them. There seems to be very little, if any, parallel processing of information. Abstractness is the only clue to the linguistic nature of (7). The encodedness is thus minimal.

In the deictic (pointing out) and referential system of English syntax, some uses of pronouns are more linguistic than others. Apart from their various lexical forms, which are themselves fairly encoded, the ability of a pronoun to refer is sometimes dependent on a simple, unencoded method of reference. When a speaker says (8) and picks out a real-world immediate reference by pointing directly at someone, the case relation of the pronoun him is encoded, but the reference by pointing is not.

(8) I've never seen him before.

The pronoun's reference is not conditioned by the context, for no matter where the pronoun occurs in the sentence, the direct deictic reference is the same. There is no parallel processing of information; the pointing is used for reference only. Again, there is no direct evidence on perception, but one would assume that far from being categorical, a listener's perception of direct deictic reference is dependent on how the listener understands the pointing. Even the abstractness is lost here, since a change in the form (the direction of the pointing) will cause a corresponding change in the meaning (the intended reference of the pronoun).

There are also pronouns whose reference is dependent on rather encoded linguistic variables. The reference of the anaphoric pronouns in examples (9) through (12) is conditioned by the command relations, defined in terms of order and subordination.

(9) Before I met him, John never worked very hard.
(10) John never worked very hard before I met him.

(11) He never worked very hard before I met John.
(12) I met him and John never worked very hard.

In (9) and (10) the antecedent 'John' commands the pronoun him, but in (11) and (12) 'John' does not command the pronoun him or he. The exact definition of the command relation need not detain us here. What is important is that him refers to John only in the first two sentences, when the command relation holds. In the second two sentences him or he must refer to some other person also male. Certainly this mode of reference is context conditioned. Both the meaning and the reference of the pronoun are processed together, and surely this type of anaphoric reference is abstract. We can conclude that while direct deictic reference is rather unencoded, anaphoric reference constrained by the command relation is considerably more encoded.

Prosodic features, as mentioned earlier, are not generally very much encoded, but in certain syntactic functions they do become part of the encoded linguistic structure. Restrictive and non-restrictive relative clauses are usually distinguished by particular junctures (changes in the intonation of the voice speaking the clauses). Those same junctures at different points in the grammar are not distinctive, do not make any important difference in meaning; but with relative clauses they are distinctive. This means that a normally unencoded feature of a language can be encoded for a particular function.

This measure of encodedness is very likely to show us that not every part of every language's system is encoded to the same degree. A language with a highly encoded morphology —such as certain American Indian languages have—may well have a somewhat unencoded syntax, but that hardly implies that it must lose its status as a language.

Encodedness in ASL. Some investigators of American Sign Language (most probably those who have noted especially the relatively unencoded parts of the linguistic system) have declared that ASL is not a real language, is not linguistic, although they grant that it may be used as a means of communication. Other investigators, who have looked at the more highly encoded parts of ASL have argued strongly that it is a real language. It is probably pointless to argue whether or not a particular means of communication is or is not a language because we do not have a nonarbitrary definition of language. But it may be illuminating to discover how the elements of ASL measure up to the criteria of encodedness.

The basic encoding unit of ASL is the word. There are exceptions, but in large measure the word formation rules of ASL are highly encoded. Each sign consists of a certain hand-arm configuration at a particular location in the signing space. In addition each sign consists of action, normally movement, of that configuration. Many of the hand-arm configurations have slightly different variants conditioned by the context. Locations and actions also have variants conditioned by context, although some of these variants may also be conditioned by the speed of signing (Stokoe 1960 [1978]). Unfortunately information on the perception of these features is unavailable and awaits further research (but see McIntire below and reference to Lane et al.).

Because the three aspects of a manual sign—hand-arm configuration and presentation, location, and action—are all combined in a single sign, there is clearly parallel processing of information. With regard to abstractness, there is a wide variation in signs. A few signs have the properties of an index; e.g. *me*, *you*. A large number of signs appear to be icons only after one knows their meaning; i.e. *jump*, *cat*, *sun*, *meet*. Another large number of signs are truly abstract, although in some cases folk etymology may attribute some iconicity to them; e.g. *man*, *happen*, *summer*. Thus, while individual signs may be highly encoded, not all signs necessarily are.

The device of negative incorporation is an example of a highly encoded part of ASL grammar and syntax (page 66 above). A class of predicates—including the signs for 'good' and 'with'—are made negative by an outward turn of the hand in making the positive sign, thus incorporating the negative meaning without adding another sign. Depending on the formation of the particular sign, this outward turning will be made slightly differently, so that there is necessarily context conditioned variation. There is also parallel transmission of information, since two formerly separate signs (one for the predicate and one for the negative) are now combined in a single sign. As with the higher levels of structure in any language, it is difficult to test directly the perception of ASL negative incorporation, but impressionistic reports indicate that the different forms of negative incorporation are perceived as the same; i.e. they are perceived categorically. Furthermore, negative incorporation is fairly abstract, since a modification of its form does not correlate directly with any change in its meaning. E.g. the sign GOOD is made by the upright, central, supinated (palm-in) forearm extending forward with a simple straightening of the elbow angle. The sign with negative incorporation meaning 'bad' is identical except that the forearm makes a pronating rotation as it extends. This pronating motion can be made to any degree (turning the palm to the side or out and down), but no matter how far it is turned, the sign means 'bad' and the sign without the pronation means 'good'; there is no intermediate meaning such as 'fair' with some degree of rotation between little and much.

We should take pains here to distinguish the abstract feature of negative incorporation from a similar feature of emphasis that is not abstract. When the sign GOOD is made quickly and forcefully it may mean 'very good'. With this feature of emphasis a signer can vary the degree of meaning from 'good' to 'very very good' with the strength of the sign's performance; in a similar way English speakers may use emphatic stress on good. Both emphatic processes are relatively unabstract and unencoded. Similarly the negative-incorporated sign BAD may be made to mean 'very bad' by the same feature of emphasis. The important difference between the abstract negative incorporation and the non-abstract emphasis is that the non-abstract feature is capable of expressing a continuous semantic range—from 'good' to 'wonderful' or from 'bad' to 'terrible'—but the abstract feature expresses either one semantic category or the other—'good' or 'bad' but nothing in between.

In ASL as in English, pronominal reference is sometimes encoded and sometimes not. Real-world deixis, i.e. pointing to an object or person, is a rather unencoded feature of signing. Direct pointing does not vary in different contexts, there is no parallel transmission of information, and it is far less abstract than the English pronominal system; it is thus less encoded. Friedman's finding (1975) that real-world deixis takes precedence over any other type of reference makes the whole reference system of sign pronouns relatively less encoded than English pronouns.

But there are other kinds of reference in ASL that are more encoded. For example, certain verbs incorporate the pronominal reference to certain nominal arguments (the agent 'I' in SEE, the object looked at in LOOK) in their unmarked, citation form. So the sign TEACH incorporates reference to a first-person agent and often second-person beneficiary in its citation, dictionary listed form. By reversing the directionality of TEACH a signer makes the second person the agent and the signer the patient. Both case role references are incorporated into the (changeable) direction of the sign's action. Here is parallel transmission of information: the verb, its agent, and its patient are all given in a single sign. Here too is context conditioned variation. The incorporation of case roles is consequently an encoded part of sign language structure, a linguistic part of that structure.

Reduplication is generally an encoded feature whenever it occurs in a language. By its very nature any reduplication is context conditioned and transmits information about two semantic elements simultaneously. In ASL a good many verbs (among them SEE, WANT, READ, KNOW, DRIVE) may reduplicate, i.e. repeat part of or all of their characteristic action; and the semantic force of such reduplication is to signal continuing action, the progressive aspect (see above, Chap. 1). Two different kinds of reduplication have been noted in ASL: a habitual aspect (meaning 'all the time') is signalled if the sign is repeated quickly with a horizontal sweep; and a continuous aspect ('for a long time'), if the sign has a slow, drawn out repetition (Fischer & Gough, below, Chapter 6). There is also simple repetition that generally translates the same meaning as using a form of be in English followed by the -ing form of the main verb.

Another feature of ASL grammar is that many verb signs allow some adverbial modification so that the way the sign is made is directly related to the action or process or state that it represents. Thus the sign ACCIDENT may be signed gently for a little bump and more vigorously for a more serious collision. Although there is parallel transmission of information indicating some degree of encodedness, these adverbial modifications are not very abstract, because the amount of force used in making the sign correlates continuously with the force implied in the meaning. This is a good example of a partially encoded feature. [Here the reader is reminded that Abbott's discussion of encodedness was written in 1975 and that much research on the encoding of information in ASL has been done in the relatively short time since; see especially chs. 11 and 12 "Aspectual Modulation on Adjectival Predicates" and "The Structured Use of Space and Movement" in The Signs of Language by Klima and Bellugi (1979).]

Conclusion. If the notion of encodedness as developed and illustrated here captures some important organizing principles of linguistic structure, both from a biological viewpoint and from a structuralist viewpoint, then it is a valuable guide in the investigation of linguistic structures—more valuable it is to be hoped than trying simply to determine whether a particular communication system should rightfully be called a language. The illustrations here demonstrate at the very least that both English and ASL encompass a range of encoded and relatively unencoded features. It remains for further research to put together the total picture and to determine the exact extent of encodedness in ASL as compared with other languages.

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PART ONE: 3

CHILDRENESE as PIDGIN

Dennis R. Cokely
Rudolph Gawlik

Perhaps one of the most frustrating experiences for parents and educators of deaf children is being unable to understand fully the sign language behavior of the deaf child. This frustration is echoed in statements like, "That's not what the book says;" or "That's not how we learned it in sign class;" or "My child's signing seems to be different!" This communication gap is experienced even by parents and educators who have been using signs for several years. The explanation that the children "just sign too fast" does not account completely for this gap, for there are many parents and educators who have gained proficiency in the use of American Sign Language (ASL) and who are not bothered by the speed of deaf adults' signing, yet they still confess a lack of understanding of children's sign language. The feeling is that perhaps the children are signing a totally different language—different from what is taught in the numerous sign classes throughout the nation.

The thrust of what follows is that in fact deaf children are using a different variety of sign language. This language, childrenese, is neither adult ASL nor is it signed English.

This fact should not be surprising. There are many factors which would lead children to develop a sign language that is neither ASL nor standard English recoded in signs. First, it should not be surprising that childrenese is not ASL. Most of the children currently enrolled in schools for the deaf (with the exception of deaf children of deaf parents, a tenth of them at most) do not know and use adult ASL because:

a. hearing parents and educators for the most part lack the skills to be effective models of ASL

b. in most schools for deaf children there are only a few deaf teachers who consistently use ASL

c. in most schools for the deaf child the pressure is to model English and not to model ASL.

It should not be surprising that childrenese is not English either, because:

a. few schools have a fully implemented policy of consistently signing English (this applies also to the homes of the deaf children)

b. few teachers have the skill to present English clearly and correctly in signs at various linguistic levels and to monitor and adjust to the individual child's attempts at English

c. only a small percentage of English is visible on the lips of those nonsigners (parents, teachers, etc.) who have regular contact with the child.

Childrenese as a pidgin. If childrenese is neither ASL nor English, what is it? In an attempt to describe childrenese it is useful to draw upon the linguistic notion of pidgin languages. In a paper entitled "Some Characteristics of Pidgin Sign English" Woodward says:

> It is generally agreed that pidgin languages are reduced in structure, contain a partial mixture of structure of two to several languages, and contain structure common to none of the languages in the communication situation. (1973: 39; see also Ch. 1 above)

Figure 1 may be helpful in understanding the notion of this mixture in pidgins.

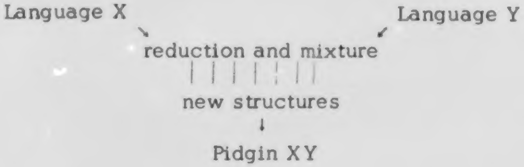

Figure 1. Diagram illustrating pidgin languages generally.

Stokoe (1970) and others have noted that there is a continuum of language varieties between ASL and English expressed or encoded in signing. Woodward (Chapter 2) calls this "the deaf diglossic continuum" and proposes that some of the language varieties, between ASL and English, on this continuum may properly be called Pidgin Sign English (PSE). PSE is illustrated in Figure 2.

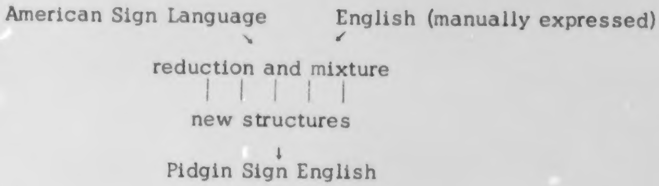

Figure 2. Diagram illustrating pidginization of ASL and English.

Bernard Bragg says that adult users of sign language often sign a mixture (use a variety on the continuum) of ASL and English, which he calls "Ameslish" (1973: 673). He adds:

> The crux of the whole thing, however, is that neither of us, high verbal or low verbal (deaf persons), really utilize English or Ameslan (alias ASL) in its purest possible form. Our true vernacular is always made up of varying percentages of literal and nonliteral aspects of expression, which works exceedingly well for us as individuals—both expressively and receptively. For some of us who are high verbal, it is always English that dominates over Ameslan; for others, who are low verbal, it is the other way around...[Ameslish] embraces actual speaking, or word-mouthing, fingerspelling (abbreviations and "slurrings" tolerated), gestures, ASL grammar, pantomime, SEE-devised signs, body English, facial expressions, acting, and what have you.

Childrenese may now be placed in the context of Pidgin Sign English and the changes and expression modes Bragg has indicated. Figure 3 may serve to suggest relationships between the language varieties already mentioned.

American Sign Language ↘ ↙ English (manually expressed)
reduction and mixture
| | | | |
new structures
↓
Pidgin Sign English
↓
further changes (described by Bragg)
↓
"Ameslish"
↓
children's changes
↓
childrenese

Figure 3. Diagram illustrating further changes in Sign-English pidgins.

Characteristics of childrenese. The following examples of childrenese have been gleaned from two years of observation and approximately 50 hours of transcribing videotapes of children's signing at the Kendall Demonstration Elementary School (Gallaudet College, Washington, D.C.). Perhaps what is described here would more properly be called "Kendallese;" however, some of the following characteristics and patterns are found in the signing of children in the vast majority of schools for the deaf in this country.

(In the four sections below, the same spatial design used in the diagrams of Figures 1-3 is used. The characteristics of ASL are on the left, those of English on the right, and those of childrenese centered below. Following the descriptions of the characteristics are examples in the same spatial relationship: top left ASL, top right English, and below center Childrenese. In the examples of the two signed languages, capitalized words represent signs that by a convention well distributed in the sign linguistics community relate to the English word so appearing. Hyphenated capitalized words give the approximate meaning of a single sign (or a repeated sign). Words in lower case with extra spacing between the letters indicate a fingerspelled item in an example.)

1. Question forms

ASL has signs to ask who, what, when, where, why, how, etc. Facial expressions also mark questions

ENGLISH has specific words for questions and also uses pitch, intonation, stress, and facial expression

CHILDRENESE uses two signs almost exclusively for its questions: FOR-FOR, DO-DO

E.g.

WHY (YOU) HIT LARRY ASK-YOU Why did you hit Larry?

FOR-FOR HIT LARRY FOR-FOR

2. Time expressions

ASL has signs meaning 'past, during, since, before, after, future, tomorrow, yesterday, next year, last year, last week, everyday, every week, etc.

ENGLISH has all of the ASL possibilities plus periphrastic constructions and verb tenses

CHILDRENESE for the most part uses only the following:
TOMORROW = 'any time in the future'
YESTERDAY = 'any time in the past'
EVERYDAY = ' something that happens regularly'
NOW

E.g.

LAST-WEEK TUESDAY (I) SICK Last Tuesday I was sick.

YESTERDAY TUESDAY ME SICK

Because of the limited range of time signs there is a tendency (and a need) to relate incidents in chronological order. Thus, an entire series of events may have to be related before a main point can be made. Childrenese also lacks time connectors other than THEN and FINISH. Ideas are related only chronologically; there is little or no subordination of ideas.

3. Negation

ASL has signs equivalent to no, not, don't, nothing, none, not yet, can't, don't care, no matter, refuse, etc. Also uses headshake and negative-incorporating signs (Ch. 2)

ENGLISH has all the ASL choices plus headshake, pitch, stress, and intonation.

CHILDRENESE has NO, NOT, NONE and also headshake. Often an entire utterance is made negative by ending it with NOT

E.g.

I LATE STEAL CANDY (with headshake)

I didn't steal the candy.

LATE-LATE ME CANDY STEAL NOT

4. Suprasegmentals

ASL tends, according to Fant, to place the visually most important item first or last in the utterance; also uses pause or juncture to make meaning clear and positioning of signs on "sight line" (1972: 2, 62)

ENGLISH has very definite word order, uses pause or juncture to aid in clarity of phrasing; dialogue is indicated by pitch, intonation, stress, and juncture.

CHILDRENESE has few fixed patterns; visual importance seems not a factor; little pause or juncture appears; no use of the "sight line" to clarify dialogue

E.g.

(Examples of the three-dimensional use of space cannot be captured in print or 2-D diagrams)

I didn't. (You) Think I did? I'll ask Ira. I don't hit Glenn everyday of the week, do I? Ira says, "No, you're right."

> ME LATE-LATE THINK ME ASK-TO
> WHEN ME HIT ME EVERYDAY EVERYDAY WEEK HIT glenn SAY ira
> RIGHT-TALK YOU (English example above is a translation of this videotaped passage)

5. Lexical items.

In childrenese, we note that specific lexical items, although they may be authentic signs of ASL, sometimes have very limited meanings or take on entirely new meanings. In the example above, for example, LATE-LATE is a denial (instead of having its ASL sense 'haven't' or 'not yet'); THINK-ME is a common sign meaning 'do you think that I'd...'; and RIGHT-TALK is the most emphatic affirmation of a statement (often only a mild 'true' in ASL). Other examples in Kendall School childrenese show an even greater departure from ASL lexical meanings— TEMPT (tapping the underside of the elbow with the index finger of the opposite hand) here means 'talking behind someone's back'; and the common ASL sign BRIBE has come to mean 'going off the point' or 'changing the subject'. Of course some idiosyncratic vocabulary is found in every school for the deaf; it is usually referred to as "local" sign.

In addition to these characteristics, which may or may not be peculiar to Kendall Demonstration Elementary School, there are other obvious qualities of children's signing that could be pointed out. There is in children's signed conversation variable and inconsistent use of articles, plurals, forms of the copula, and verb inflections—all depending on the degree to which the children attempt to incorporate some of English structure into their language. Woodward cites these same characteristics as common to pidgin languages:

> In most pidgins, articles are deleted; the copula is usually uninflected; inflections such as the English plural are lost; and most derivations are lost just as they are in PSE. Perfective aspect in pidgins is often expressed by finish or a similar verb like done. (1973: 42; and chapter 1 above)

Teachers and parents of deaf children will surely recognize the ever present sign FINISH to show completed action in children's signing.

The above examples are enough to suggest that childrenese is linguistically different both from ASL and from English. It is worth noting that while some of the structures in childrenese may occur in ASL, the latter offers more variety, specificity, and precision of expression. In childrenese there is evidence of reduction and admixture of the structures of both ASL and English; there is evidence of a limited choice of expressive structures; and there are new structures that are common to neither English or ASL. It is therefore reasonable to conclude that childrenese as described does fall within the category of a Pidgin Sign English.

Perhaps notice should be taken of a kind of development in children's language; in that case "home signs" are still further from the two major languages in the communication situation and could be shown as a line below childrenese in Figure 3.

Implications of childrenese. Identifying childrenese as a pidgin and placing it on the deaf diglossic continuum is hardly enough. The fact that childrenese is a different language variety has, or should have, several important implications for any school with deaf pupils. Obviously someone in every such school should study the everyday language the children use and do some basic analysis of it, so that the teachers, staff, and parents will have a working knowledge of the language actually used by the children—the language in which they are comfortable and presumably most able to understand fully. Teachers who are unfamiliar with the structures of childrenese cannot adequately model or teach appropriate English equivalents.

For example, a six year old hearing child says, "Maybe we will get thirsty or eaty!" The expected reply by teacher or parent would be, "Yes, maybe we will get thirsty or hungry." But suppose that the teacher or parent in this situation did not understand what the child meant by the odd form "eaty." In that case the reply might have been, "Yes, maybe we will get thirsty or hot." Similarly, when a deaf child signs, ME FINISH BATHROOM, FINISH ART, FINISH EAT, if the teacher replies, "No, you can't go;" it becomes obvious that the teacher's lack of understanding of the sign FINISH as it is used in childrenese not only destroyed communication but also eliminated the opportunity for teaching a correct English way of expressing what the child wanted to say (that he had been to the bathroom, finished his art work, and had eaten lunch, and most important, wanted to know what the teacher wanted of him now).

Besides the fact that pidgin languages have attracted the attention of linguists interested in language structure, the simple truth is that pidgins work—they are useful in the situations where they are used. Persons who do not understand the native language of those with whom they must communicate have need of a common language (perhaps while one or other of the parties learns the other's language) and so they readily (and unashamedly) turn to a pidgin. Considering the current situation—deaf students may not be able to communicate satisfactorily in English or in ASL—teachers, parents, and school staff members should enthusiastically utilize childrenese as an aid toward the child's mastery of English and ASL.

At the very least, each school for the deaf should discover and inform teachers, staff, and parents of the local vocabulary, idioms, and patterns in the children's language. Such knowledge is a necessary and invaluable tool for communication and instruction. This is merely to follow a widely accepted principle of effective communication and instruction —meet the student at his or her own level—linguistically too.

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PART ONE: 4

WIT & POETRY IN AMERICAN SIGN LANGUAGE

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Abstract. One measure of the psychological reality of more abstract linguistic categories, for native users of a language, is the extent to which those categories are manipulated in such "secondary" uses of language as poetry and wit. The authors are particularly interested in how wit and poetic form in sign language are determined by the visual-gestural mode. A dichotomy will be developed between those properties of the heightened use of sign language that are involved more essentially with the structure created by aspects of movement in general and those that are involved more purely with the grammatical code itself.[1]

In terms of propositional or referential content, it matters little that in English, for example, worst (the superlative of bad) and wurst meaning 'sausage' sound the same; or that June, moon, croon, swoon have the same vowel and final consonant; i.e. that they rhyme. But there are functions of language outside of the purely referential for which such otherwise incidental similarities become significant in terms of the totality of what is communicated—in terms of the total import of an utterance. Among cases where this is obviously true for the English speech community are puns; such a punning ad-slogan for mustard as "It brings the best out of the worst (wurst)" derives its full import from the wurst/worst ambiguity in English. And of course just such rhymes as June, moon, swoon, croon provide the basis for a superimposed structure of sound whereby mere sentences take on, in addition, that special significance of the patterning embodied in verse—albeit the sentences may express inanities and the verse may be doggerel. What is special about puns, verse, and poetry in general is a heightened awareness of linguistic phenomena as linguistic phenomena. As Jakobson (1960) puts it: "the set toward the message as such, focus on the message for its own sake, is the poetic function of language" (p. 356).

Like "art for art's sake" language for language's sake would be pure poetic function. While the poetic function certainly dominates in various forms of language-based art—and certainly very much so in lyric poetry—the poetic function is also represented in everyday language use, though in a less structured way.

In what follows, we shall attempt to show that the poetic function is represented also in the linguistic activities of the Deaf community's use of its primary visual-gestural language, American Sign Language (ASL).

I: AN ANALYSIS OF WIT AND PLAYS ON SIGNS

We have often been asked whether puns and other sorts of linguistic play are possible in ASL. Sometimes the question arises along with the much older question of whether or not the gesturing of deaf persons does or not constitute a "language" in the sense that English, say, is a language. [see Chapter 2 above] Perhaps, or so this question sometimes implies, the existence or non-existence of the special form of wit known as punning could give us clues to the status of ASL as a language, since punning relies so heavily on the form of a language. Certainly the older literature on signs and signing contains much that would lead the uninitiated to question whether such possibilities exist. Tervoort (1961) claims that the spontaneous use of signs in an ironical or metaphorical way is rare to non-existent.[2] One might be led to suppose that linguistic creativity in the form of punning and other playful manipulation of linguistic units is also absent. One might even be led to ask if the general sort of structural properties present in all spoken languages that provide the basis for such linguistic play might not somehow be absent from sign languages. Thus, since punning and rhyming can inform us about significant structural properties in spoken languages, it is relevant to ask whether or not punning and other forms of linguistic play are possible in ASL.

By 'punning' we mean the calculated use of one word in an utterance in such a way as to suggest, at the same time, the different meaning of another word having the same (or nearly the same) sound. To say, "If you take care of your peonies, the dahlias will take care of themselves," is to play on the similarity in sound of peonies and pennies and of dahlias and dollars, as well as on speaker's and listener's knowledge of an old saw. When a critic talks of a new series on TV as "The blind leading the bland," he is playing on the similarities in sound between bland and blind, and on another cliche (although such cliches are not essential to punning).

What are the ingredients required in ASL—aside from a kinky imagination bent on verbal punishment? The basis, it seems, is the occurrence, and the awareness on the part of signers, of homonyms or near homonyms. These there are in plenty in ASL, as we have found from the typical errors made in short-term memory experiments we have conducted (cf Klima & Bellugi 1979). Among many others there are pairs like the sign CHAIR and one of the signs meaning 'salt'; the sign FURNITURE (Western U.S.) and the sign translated as 'nothing to it'; the sign THIRTEEN and the sign EJACULATE. Thus the ingredients are certainly there within the language. And we can report that the awareness and the quirky imagination required to make use of them (and, with mock disdain, to recognize them) is present among deaf signers using ASL. One deaf person signed the equivalent of, 'You know he's a man when a boy ejaculates (becomes 13).' Is there the possibility of punning in ASL? Yes, there is, and punning does occur as wit in the communication of deaf persons.

Those who ask us such questions may not realize, however, that there is a rich and abundant use of sign-play by deaf people in ASL —a use that does not depend on the general principles of punning but rather on principles that are special to sign language itself. We shall examine here some of these special principles of sign-play used for wit and humor in ASL. We find that such sign-play frequently involves one of three basic processes:

Process 1. The overlapping of two signs: this can occur in different ways: (a) by making the two signs simultaneously, or (b) by holding a sign (or part of it) while making another sign. The overlapping of two signs relies on a possibility that exists in sign language but not in speech.

> Because we have two hands we can, in principle, make two different [manual] signs at the same time—one with either hand. Our impression is that the desired goal of some of these overlappings in ASL wit is to achieve the ultimate compression of meaning into a minimal number of units.
>
> Process 2. The blending of two signs: this can occur (a) by making one sign and then blending it into another sign so that the two form a complex unit, or (b) by blending together at the same time properties of two signs—again the result is a kind of compression.
>
> Process 3. The substitution of one regular ASL "prime"[3] for another in a sign—such substitutions can occur in any of the major parameters: hand configuration, place of articulation, movement, orientation of the sign. The resultant gesture, in such substitutions, is not an existent ASL sign, but rather a possible sign—one closely resembling a particular ASL sign in all but one prime of one parameter. The particular changes in primes generally have morphological or other symbolic or iconic significance.

In the following sections we will spell out with examples these three basic processes, which by no means exhaust the possibilities of linguistic play in ASL. The examples are from our daily association with deaf people and from our videotapes of everyday signing.

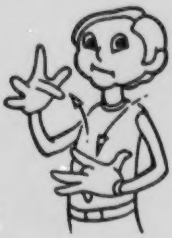
1. The overlapping of signs.

In signing, because of the existence of two autonomous articulators (i.e. the two hands), there is the logical possibility of producing two independent [manual] signs simultaneously. Moreover, such simultaneity would not be inconsistent with some of the facts and impressions about ASL that have been mentioned in the past: the weakness of order of signs alone as a clue to grammatical function (Fischer 1975); the apparent tendency to compress information into single units (see Klima & Bellugi 1979: ch. 8); and the use of simultaneous (rather than sequential) modifications of signs to modulate meaning (Chapter 6 below). In everyday signing, in fact, one class of signs does occasionally manifest this sort of simultaneity: the deictic signs in which the pointing hand is directed to a locus in signing space to be used as a basis of "pronominal" reference—glossed as (THERE), (HE), (SELF), etc. (see Friedman 1975). Aside from the simultaneous production of a deictic sign with one hand and a nominal sign with the other, there are many other logical possibilities; e.g. the simultaneous signing of a subject with one hand and its predicate with the other. However, we have found no such instances in our data of conversational signing. Although the visual mode could theoretically accommodate such simultaneity, sentences in conversational ASL are not composed of simultaneous signs. [Editor's note: The failure to find such sentences may be due to limiting the search to manually produced signs. In conversational signing such a question as 'Are you interested?' is usually simultaneous in ASL, with a manual sign expressing the adjectival or state-verb predicate and head, face, and eye action expressing at the same time the subject and question indication. Some simultaneous two-sign manual sentences have also been observed—pp. 27 - 30 above.]

Overlapping of signs does occur, and quite frequently, in selfconscious signing of preplanned material, in the plays on signs that deaf people love to make, and, as we shall see later, in poetic signing as well. Let us examine a few cases of overlapping (simultaneous) signing in wit.

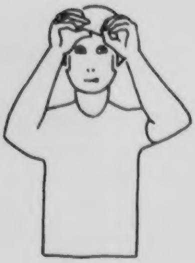
a Making two signs simultaneously. Strict simultaneity is best defined as having the movement of a sign being made by one hand coincide with the movement of a second distinct sign being made with the other hand. Certainly there are restrictions on this type of simultaneity, having to do with the difficulties of making two different motions, one with either hand. The least complex movement of ASL signs is that of making a contact with some part of the body or with a point in space. This is not difficult to combine with the movement of other signs. However, we have seen other types of simultaneity in plays on signs.

E.g. 1: We asked a young deaf man how he felt about leaving a place he loved for a new situation and a new job. He summed up his feelings eloquently by making simultaneously the signs for EXCITED and DEPRESSED (Figure 1, Plate 1). Ordinarily each of these signs requires two hands operating symmetrically. Instead, this signer made "half" of each sign with either hand. Not only are the signs antonyms, they are also related for-



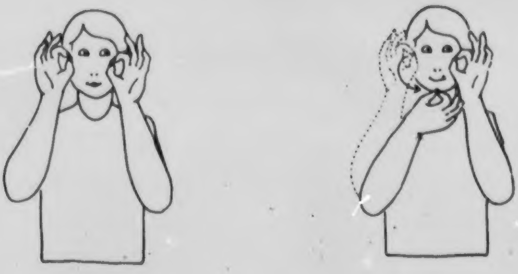
"EXCITED/DEPRESSED"

Figure 1



"CLEVER/EMPTY-HEADED"

Figure 2



EYES

"EYES/EXPERT"

Figure 3

PLATE I: THE OVERLAPPING OF SIGNS

mationally, differing only in the direction of movement (upward brushing of the chest, downward brushing of the chest). Thus the signer compressed into a single new sign-creation his ambivalence of emotions.

b Holding one sign (or part of it) while making another.

This involves making one sign and holding the final position and handshape of that sign while making another sign with the other hand. The final positions of both signs are then held. Again, this depends on either choosing signs that are made with one hand only, or on changing a sign so as to make it as a one-handed sign.

E.g. 2: A deaf person signed to us that she is clever at reading signs but poor at remembering them long enough to write them down. She first made the sign CLEVER with her right hand, and then held that while she made EMPTY-HEADED with the other hand (Figure 2, Plate I)—thus indicating her mixed evaluation of her competence. These are both one-handed signs, with different handshapes but with a simple contact for movement, and thus are easily combined in this way.

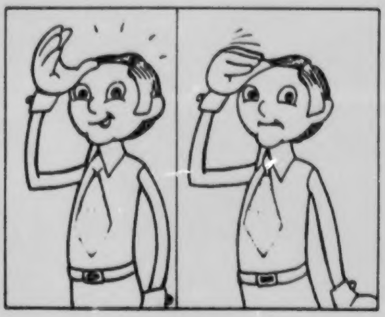
E.g. 3: A young deaf man was seen each day with a different girl. When we commented that he had an eye for pretty girls, he twinkled and signed what could be rather freely translated as, 'Yes, I'm an expert (girl-) watcher.' He first made a sign for EYES, one that mimics the eyes with two hands. Then holding the final position of "half" the sign with one hand, he made the sign EXPERT with the other (signing "eyes-pert" as it were—Figure 3, Plate I). The combination is particularly effective in ASL because the two signs he chose use the same handshape.

2. The blending of two signs. There are various ways of blending two signs into one unit. One can make one sign and then add the movement of another sign so that the two signs become one unit. One can take, say, the handshape of a name sign and make it with the movement, location, and orientation of a different sign blending the properties of the two into one unit. One can make a sign and continue its movement throughout what would normally be the transition to the next sign, allowing for slight changes in orientation or location, until one sign has been transformed into another.

E.g. 4: One day we were particularly inept in our attempts to sign. Our deaf teacher good-humoredly signed to us that ordinarily we are clever, and then by blending the sign CLEVER with the sign DEFLATE and the formationally related INFLATE, she suggested playfully that today the cleverness was deflated but that tomorrow—after a good rest—the cleverness would become inflated again. She made the sign for 'clever' on the forehead as usual with one hand. At the same time she blended that with the movement of another sign, usually made with one hand on the other and meaning 'deflate'. She then "re-inflated" the sign back to CLEVER again (Figure 1, Plate II).

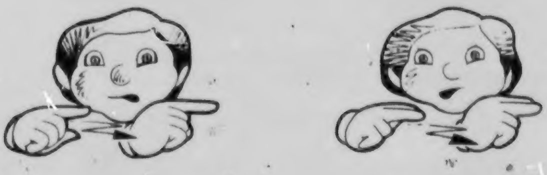
E.g. 5 (not illustrated): Name signs are often blends of two signs (See also Meadow 1977). Name signs often begin by forming the handshape corresponding to the fingerspelled initial of a first or last name and choosing a location and a movement for the hand in that configuration. The name signs for people in our research group were all given to us by deaf people who work with us. It happens, not infrequently, that as people become better known, deaf people begin to blend that name sign with some other sign that refers to a special characteristic of the person, often originally as a joke or to differentiate several people with the same simple name sign. The name sign for Ursula Bellugi is a U-hand on the side of the mouth with a soft repeated contact. Because she always jots down with great excitement any new sign she sees, one deaf person dubbed her 'Ursula the Copier', by blending the U-hand of her name sign with the location and action of the sign COPY.

E.g. 6: We do not know the history of the next sign, but its combinatorial properties are very clear. Long before the impeachment issue arose, deaf people had a name sign for (former President) Nixon, which was used commonly on the signed interpretation of TV news. This name sign consists of the handshape (the same as U-hand but horizontal) representing the letter 'N' made across the chin with a brushing motion. This sign is a blend of a name sign with 'N' and the ASL sign LIAR, which is made by an index or G-hand brushing across the chin. Thus the name sign had indicated, long before the scandal and resignation, that he was 'Nixon the Liar' (Figure 2, Plate II).



"CLEVER + DEFLATE"

Figure 1



LIAR

"NIXON-THE-LIAR"

Figure 2

PLATE II: THE BLENDING OF TWO SIGNS

There are other kinds of blends. In some plays on signs, a sign is made and the movement continued throughout what would be the transition to the next sign, while allowing changes in orientation to take place until one sign has "become" another. In the examples we have found, these depend on choosing signs with the same handshape and similar location:

E.g. 7 (not illustrated): There is a sign of recent coinage that means 'total communication'; it is made with the hands alternately moving away from and toward the signer at neck level. In one play on signs involving this sign, as the movement of the sign repeats alternately, the hands gradually move closer and closer to the mouth, until finally the signer is making the signs for 'drinking' with one hand and 'smoking marijuana' with the other. Here we have a case of double blending.[4]

E.g. 8: One time we were explaining to deaf colleagues that the blending of signs depends in part on the felicitous choice of signs in the first place. There is a sign meaning 'wise', another meaning 'brilliant', and a third meaning 'clever'—all formed in very different ways. We non-deaf were stressing the importance of the choice of the form of signs in creating plays on signs. In order to blend the movement of DEFLATE with another sign, we argued, a particular handshape is required, which happens to occur in the sign CLEVER but not in the other two signs. One deaf persons listened to the explanation, nodded in apparent agreement, and then, as if to show that wit has few restrictions in the right hands, he made the sign WISE and allowed the hand to droop, suggesting 'wisdom wilting'; then he made the sign for 'brilliant' and made it shatter into the sign DUST; and for good measure, made the sign WISE again, continuing the movement of the sign while changing the orientation of the hand slightly, until WISE had turned into PUZZLED.

These, then, are various ways of overlapping and blending two signs. Linguistic jokes involving these mechanisms depend on the choice of particular combinations of meaning and form (as does punning); some of them also depend on making deliberate use of a rarely used possibility in sign language—forming two signs simultaneously, one with each hand.

3. Substitution of one regular ASL prime for another in a sign. The third general process we will illustrate used in plays on signs is a change in one of the basic parameters of a sign so that there is simple substitution of one prime of that parameter for another. This is essentially a distortion of a sign so that all but one of the basic characteristics of the sign are retained. The result of this sort of linguistic play is a possible but not an actual sign of ASL: neither a citation form nor a standard modulation of a sign. But it differs from an actual ASL sign in a way that is significant and meaningful—either in terms of ASL morphology, or in terms of more general spatial-gestural symbolism. Appreciating the wit (and often, in fact, recognizing the actual sign behind the distortion) usually depends on knowing the context in which the new sign was created.

It is important to distinguish the differences between various phenomena all characterized by the substitution of one prime for another. In the memory experiments previously referred to (Klima & Bellugi 1979: ch. 4), intrusion errors—signs that deaf subjects "misremembered"—were frequently formationally similar to the original sign presented, and often only a prime away. However, unlike the sign-plays referred to here, the intrusion errors were actual signs of ASL. We also find substitution of primes in one other class of phenomena that are not sign-plays: exchanges of primes may occur in slips of the hand when some aspects of an intended sign message are transposed. These are analogous to slips of the tongue or "spoonerisms" in speech, and Fromkin (1971, 1973) has show how these can provide clues to the way in which language is organized. For example, if two signs are made in sequence so that, by mistake, the handshapes are transposed, perseverated, or anticipated, the result is a slip of the hand —a prime in one sign being exchanged for a prime in another sign. Slips of the hand are inadvertent, unplanned, and though they may arouse a laugh, they differ from wit (see Klima & Bellugi 1979: ch.5). The examples of ASL wit given below were deliberate, planned changes in signs depending on the linguistic parameters of the language, and they caused that special type of response triggered by linguistic play.

a Change in handshape prime.

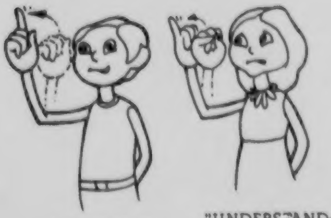
E.g. 9: On one occasion a complex technical point about transformational grammar was being explained in sign language. When asked, "Do you understand?" a deaf person replied with the sign UNDERSTAND, but instead of using the index finger (G-hand), the signer made the sign with the little finger (I-hand). The basis for this distortion is clear: the little finger occurs in a symbolic way in some signs where it conveys the notion of thinness (e.g. SPAGHETTI, THREAD, SKINNY-PERSON) or extreme smallness (e.g. TINY, INFINITESIMAL). The substitution of the little finger for the index finger in UNDERSTAND clearly carried the meaning 'understand a little' (Figure 1, Plate III).

b Change in orientation.

E.g. 10: The sign for 'New York' is ordinarily made with Y-hand brushing sideways [the active forearm is rotated in pronation bringing the bent fingers of the active handshape in contact with the other hand, and the action is rotation of the entire arm at the shoulder joint] along a flat open palm-up base hand. New York as a city has become a place where corruption abounds. This distinguishing characteristic is sometimes playfully expressed within the sign itself by making the sign, but changing the orientation of the base hand [i.e. the location marking hand is pronated instead of supinated before the sign's action begins] so that it is palm down instead and the active hand is below it. The significance of this playful change in orientation is made clear by the fact that the standard citation forms of a few signs in which the palm of the base hand faces downward [or in which the action is below the forearm whichever way the non-active forearm is rotated] have a common semantic component; e.g. the signs STEAL, KILL, BRIBE, SNEAK-A-WAY. Thus, making the sign for 'New York' with this change in orientation of the base hand [and the relative position of the two hands] can be interpreted as adding to the meaning of the sign some of the "underhandedness" of life in the big city (Figure 2, Plate III).

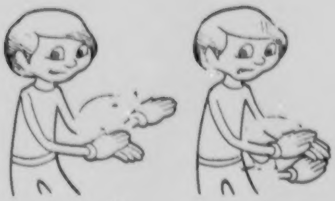
c Changes in movement.

E.g. 11: After an explanation, which may have been more confusing than enlightening, a deaf person responded with: "Yes, I understand." But the sign UNDERSTAND was made with a backwards movement. Instead of starting from a



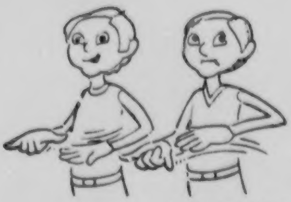
UNDERSTAND "UNDERSTAND-a-little"

Figure 1



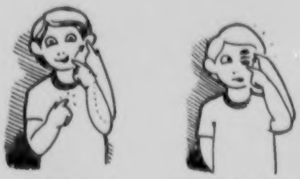
COLLEGE "non-COLLEGE"

Figure 4



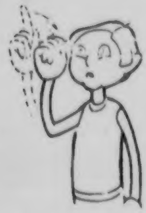
NEW-YORK "underhanded-NEW-YORK"

Figure 2



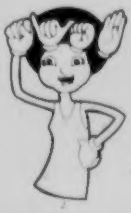
DEAF [to sound] "sight-DEAF"

Figure 5



"un-UNDERSTAND"

Figure 3



"B-O-Y-S on-the-mind"

Figure 6

PLATE III: THE SUBSTITUTION OF ONE ASL PRIME FOR ANOTHER

closed position and flipping open, the hand started from the final position [i.e. G-handshape] and changed to what should have been the initial closed position. This resulted in something that was not a sign of ASL, but could be construed to mean, 'I un-understand' (Figure 3, Plate III).
E.g. 12: One deaf person was asked if she had attended college. YES she signed, and made the sign for 'college' with the movement downward instead of upward, conveying if it can be translated at all, something like 'non-college' (Figure 4, Plate III). Such sign play is similar perhaps in spirit—but certainly not in form—to a play on words in English in which the actual English word upbringing (in the sense of 'education') might serve as the basis for the playful coining of such a form as downbringing. Certainly not all movements can be made forwards or backwards and not all signs with upward or downward movement have predictable meanings. However, there are some sign pairs which are opposite in meaning and similar in form except for a predictable difference in, say, direction of movement. The existence of pairs of signs like EXCITED/ DEPRESSED, shown in Example 1 above, helps in the interpretation and creation of the plays on signs involving such changes in movement.

d Changes in location.
E.g. 13: Ordinarily the sign RELAX is made with the hands crossed on the torso. One time a person claimed that her eyes were tired, and so suggested that she should 'relax her eyes', making the sign with her hands crossed over her face and resting under her eyes instead of on the torso.
E.g. 14: Another person told of the time he bumped into a door and his eye became bruised and swollen shut so that he could not see through it. He summed up the situation by signing the equivalent of 'My eye is deaf', making the sign DEAF across his eye instead of on his cheek. These changes depend on iconic [indexic] values of the new locations (Figure 5, Plate III).
E.g. 15: A related phenomenon is characterized by the change of location of the hand fingerspelling words, which are ordinarily signed in the space in front of the chest. One person signed that her daughter was obsessed with thoughts of young men. She conveyed that by spelling b o y s , but with the spelling hand on her forehead; i.e. literally, 'boys on the mind' (Figure 6, Plate III).

The processes of sign play that we have been describing involve manipulations of signs that are, on the whole, special to the form of sign language itself. The overlapping of two signs, for example, depends on the use of the two hands independently to create special kinds of simultaneity of signs. This is made possible by the existence of two articulators—the two hands—in producing [the manual signs of] the language. The blending of two signs, as another example, may involve the fusion of properties of two signs. Lewis Carroll attempted to achieve something similar in speech in his blends of, e.g., furious and fuming into frumious. But the essentially sequential nature of word segments does not lend itself in quite the same way to the creation of fusions as does a visual-gestural language based on simultaneously occurring parameters.

Perhaps, we may speculate, a language based on gesture and vision lends itself to particular kinds of playful extension and distortion of the shape of its basic units a little more readily than our spoken, more "frozen" words, which cannot so easily blend, overlap, or otherwise change shape. In any event, we consider it indicative of the inventiveness and linguistic creativity of the deaf people we have met that wit and humor abound in the everyday communication we have observed and captured on videotape.

II: AN ANALYSIS OF POETIC STRUCTURE IN ASL

The poetic function figures most complexly, of course, in poetry itself, where linguistic form becomes the basis for the patterns constituting the multiple layers of structure underlying a poem. In spoken language, we distinguish several major types of poetic structure. The first of these we shall call "internal poetic structure," by which we mean structure that is, as in spoken language, constituted from elements that are completely internal to the language proper (i.e. in the case of sign language, constituted from the form of standard signs in ASL—constituted from parts of the grammatical code itself). The two sub-types of internal poetic structure to which we shall address our attention here we refer to as conventional poetic structure (provided or even demanded by tradition) and individual poetic structure (individual to the particular poem). In the English literary tradition, such metrical schemes as iambic pentameter constitute the basis for a kind of conventional poetic structure. For this structure, the fact that a syllable has greater stress than the syllables immediately surrounding it becomes significant, as do the number of significantly stressed syllables. Similarly, various end-rhyme schemes that establish recurring sound patterns (e.g. aabb, abab, abba) are part of conventional poetic structure in the English tradition, as are larger designs like the Elizabethan sonnet form.

In structurally complex poetry, however, conventional structure will be overlaid with more innovative individual poetic structure, consisting of more subtle patterning of not only sound texture but also of other linguistic elements—syntactic, semantic, and thematic. Blake's "Infant Sorrow," analyzed thoroughly by Jakobson (1960), exemplifies the distinction between conventional and individual poetic structure—both constructed from aspects of the grammatical code itself.

In sign language "art-sign", we have discovered three different types of poetic structure. It seems to us that there is an Internal Poetic Structure, corresponding to internal poetic structure in the poetry of spoken languages, but the patterning of linguistic forms in art-sign is by and large individual rather than conventional. In addition, we have discovered two types of external structure, different from poetic structure in spoken language, and special to sign language poetry. One type can be distinguished as External Poetic Structure, in which the basic principles include, (a) creating a balance between the two hands, and (b) creating and maintaining a flow of movement between signs. Then there is yet another kind of structure, an External Kinetic Superstructure, a kind of design in space, which may be superimposed on the signs and the signing, just as in song we may have melodic structure superimposed on the words of a poem.

The sources for our discussion of poetic or art-sign structure are varied, but our primary source is from deaf persons who are or have been associated with the National Theater of the Deaf,[5] a remarkably talented group of deaf actors (with an occasional hearing person, often one who has deaf parents). Several of the actors have worked with us in our research at one time or another, generously giving of their time and enormous creative talents. The members of the National Theater of the Deaf have been developing a poetic tradition in sign language within our own time. This blossoming tradition involving the heightened use of sign language is based, as we shall see, on the inherent structural properties of signs and on special characteristics of signing. Aside from formal poems, we have also videotaped "songs" that deaf children invented in sign language, lullabies, children's sign games, and other aspects of what might be called "folk art" in sign language.

In order to illuminate some of the basic principles of poetic signing, we shall present an analysis in depth of a single line of poetry. Bernard Bragg, a master signer of the National Theater of the Deaf, has spent many days with us in our work and has greatly enriched our research. In order to study the creative process in the development of poetic signing we gave him as a problem a poem which he had never worked on before. We asked him to translate it into everyday signing, and then to show us the process of changing it into poetic form in ASL until he found what was to him a satisfying solution. The poem was one by e. e. cummings, "since feeling is first," and is peculiarly apt, we feel, for linguists and artists to work on together, since it juxtaposes "syntax" and "feeling." The first four lines are:

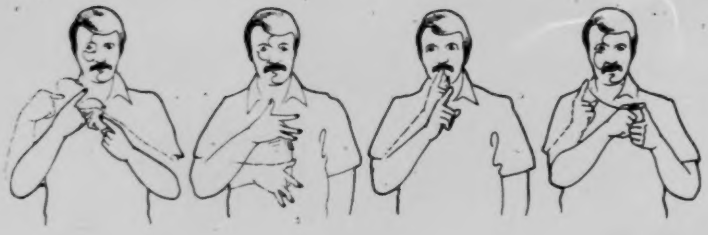
> since feeling is first,
> whoever pays any attention
> to the syntax of things
> will never wholly kiss you...

We shall present here only the first line, and study the change from "straight" (i.e. everyday non-poetic) signing to poetic "art-sign," in Bernard Bragg's capable hands. The drawings in Plate IV represent the signs which he chose to represent the meaning of the first line in straight non-poetic signing. This version is a direct literal translation of the words into signs of ASL, as can be seen from the English glosses of the signs illustrated in Plate IV.

As in normal everyday signing, we find examples of three formational classes of signs:

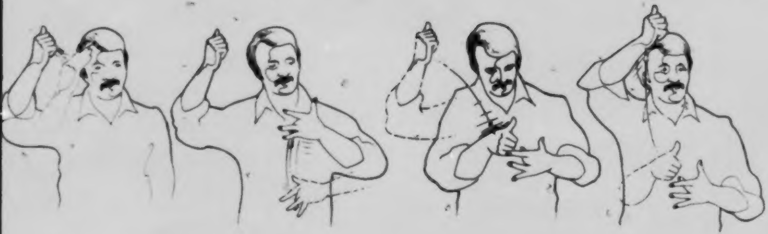
a signs involving both hands, both active and operating symmetrically—SINCE[6]
b signs made with one hand only—FEELING, TRUE
c signs made with one hand acting on the other—FIRST

A Line from e. e. cummings: "since feeling is first . . . "



SINCE FEELING TRUE ("IS") FIRST

PLATE IV: STRAIGHT AMERICAN SIGN LANGUAGE (NON-POETIC STYLE)

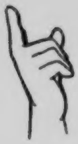


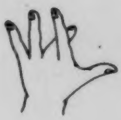
BECAUSE FEELING ITSELF "MOSTEST"

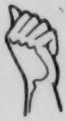
PLATE V: POETIC STYLE IN AMERICAN SIGN LANGUAGE

Because Bragg is right-handed, the one-handed signs are made with the right hand. In this "straight" version, during those signs, the left hand is by his side or otherwise not in use. In this sequence of four signs, there are changes in handshape from one sign to the next as follows:

Sign	Right hand	Left hand
1. SINCE	G	G (active)
2. FEELING	ɤ	(unoccupied)
3. TRUE	G	(unoccupied)
4. FIRST	G	Å


The "G" hand


The "ɤ" hand


The "Å" hand

The right hand, then, starts with a G-handshape, switches to an open ɤ-handshape, and back to a G-handshape for the last two signs. The left hand starts with a G-handshape, then drops down to the side of the body and returns with a thumb-up Å shape. Note that the hands not only perform the movement of the signs themselves, but also move in making the transition between signs. As one sign is finished and before the next sign begins, the hands move from one place of articulation to another, changing handshape if necessary during that transition. For example, at the conclusion of the two-handed sign SINCE, the left hand relaxes and drops to the side, and the right hand changes from a "G" to an "ɤ" as it is moving in the transition from the final position of SINCE to the initial position of FEELING. When signs are viewed in slow motion (60 fields per second), we might mention that they are observed to be held slightly in their initial and final positions so that it may become possible to identify notions like "the initial position of a sign","the movement of a sign", "the final position of a sign", and "the transition to the next sign", by objective measurements.

Internal poetic structure. In moving from conversational style to the poetic style of art-sign, Bragg made special changes (see Plate V). (While the changes he made are interrelated, we will artificially separate them for purposes of analysis.) Consider first those changes that are associated with the choice of signs—with "internal poetic structure."

Bragg replaced three of the four signs in changing from a "straight" to a "poetic" version. The only sign that remained the same in the two interpretations is FEELING. Instead of signing SINCE, he chose the sign BECAUSE; instead of TRUE, he chose the sign ITSELF; and instead of FIRST, he created a new sign in which a one-handed rendition of MOST (normally a two-handed symmetrical sign) blends with the superlative marker -EST. He himself "re-translated" the resultant blend as "MOSTEST." While not precisely like the citation form of any single ASL sign, it is certainly interpretable by a deaf viewer. Note that the three signs he chose for the poetic interpretation all have the same handshape, "A", and furthermore, that they are, in the way he made them, all made with one hand only. And as we shall see, aside from handshape similarities, there were other characteristics manifested in his particular choice of signs.

In this first line of the art-sign version of the poem, then, we have four signs, each of which is made with one hand only. The three made with the right hand share the same handshape. We have come to feel that this notion of shared handshape is analogous to such phenomena as consonance (alliteration) or assonance in the poetic tradition of spoken language.

External poetic structure. External poetic structure is characterized not by the choice of signs, but rather by their style of presentation. One general principle of art-sign seems to be that of maintaining a balance between the two hands. Signers, like everyone else, are generally either right-handed or left-handed, and sign accordingly in everyday signing; the signer will use his dominant hand to make one-handed signs; the dominant hand also is the active hand in signs in which one hand acts on the other (the base). This means that for the majority of signs there is an imbalance in the use of the two hands by any individual signer.[7] But whether, in the act of signing, it is the right hand that is active or the left is irrelevant to the grammatical code of ASL (and no two signs are distinguished by one being made with the right hand and the other with the left hand or one with the dominant hand and the other with the non-dominant.)[8] However, in the poetic tradition being developed by the National Theater of the Deaf, an external poetic structure is imposed on art-sign which includes that of maintaining a balance between the two hands. There are several ways in which we have observed ASL poets achieve this balance:

a Alternating hands in making consecutive signs. After signing BECAUSE with his right hand, instead of signing FEELING also with the right hand, as he would in ordinary conversation, Bragg uses his left (non-dominant) hand for that sign.

b Overlapping, or making (parts of) two signs simultaneously. In this one line, we note that Bragg engages both hands at all times after the first sign. He holds the sign BECAUSE (right hand) in its final position while making the sign FEELING (left hand). He holds the sign FEELING (left hand), and in fact uses it as aim or base for the sign ITSELF (right hand active). He continues to hold the final position of the sign FEELING (left hand) while making the final sign-blend MOSTEST (right hand). It is in this sense that in art-sign (as opposed to straight signing) there is a balance of the two hands—providing a basis for poetic structure external to the grammatical code proper. It will be recalled that in ASL wit we have also noted occurrences of overlapping signs.

Let us look at the use of the hands in the poetic style of signing the first line, below:

Sign	Right hand	Left hand
1. BECAUSE	A	
2. FEELING	(A)	8
3. ITSELF	A	(8)
4. "MOSTEST"	A	(8)

parens ( ) indicate handshape held during other hand's active signing

There is a second quite general principle of external poetic structure exemplified by the signing in the presentation of this one line, and that is the creation of a *flow of movement* or a *continuity between signs*. Creating flow of movement goes beyond the general principle of internal poetic structure whereby signs are chosen so that, for example, the handshapes (part of the grammatical code of ASL) of two consecutive signs are the same. Creating a flow of movement or continuity between signs is often accomplished by interesting sorts of distortions imposed on the form of the signs themselves, again going beyond the grammatical code proper. This, for the most part, is different from what we have found in plays on signs, in spoonerisms, in regular meaningful modulations of signs, or in the memory errors we collected from our short-term memory experiments, and is quite specific to art-sign. The distortions associated with flow of movement involve not only the form of the signs themselves, but also the *transitions* between signs. One way of considering this aspect of poetic style in ASL is to say that an effort is made to utilize the transitions between signs in such a way as to avoid "wasted" movement. In distorting transitions between signs, the sign-poet may attempt to make every movement—even that involved in the transitions betweens signs—"meaningful," displaying in some instances the formational properties of the preceding or following sign. We might mention that poetic signing is, in our experience, decidedly and markedly slower than signing in everyday conversational style. One might speculate that because of this decrease in rate, sign-poets may distort the shape of signs and the transitions between them without losing all comprehensibility.

The sketches in Plate IV of the straight ASL signing of this line of the poem show the position of the hands at the initial and the final stages of each sign. The movement from the final position of one sign to the initial position of the next sign would be what we are calling the "transition" between signs, and is not represented in the sketches.

Consider the sequence of signs SINCE and FEELING in straight signing (see Plate IV). The initial position of SINCE is represented by the dotted lines near the shoulder, and the final position is represented by the hands in the solid lines in the space in front of the shoulder. Similarly, the initial position of FEELING is represented by the lower drawing of the hand, which is a dotted line at the mid-line of the lower torso. The transition between SINCE and FEELING, then, involves dropping the left hand to the side since it is not in use; and, at the same time, moving the right hand from the final location of SINCE to the initial location of FEELING while changing the handshape from the "G" to an "8" hand during this movement. This is what we mean by the *transition* between signs.

In the poetic version of the line, Bragg manipulates the form of the signs so that the final position of the hand after making each sign is precisely the starting position of the next sign. The final position of BECAUSE, which is held throughout the signing of FEELING, becomes the starting position of ITSELF, and the final position of ITSELF is also the starting position for "MOSTEST." This would not be the case in the conversational style of signing the same sequence of signs. So we see that the internal and external structures of the line have been made to work together: (a) there is a simple patterning (repetition) of an element of the grammatical code—the three signs made with the right hand all share the same handshape; and (b) the continuity between the signs, already expressed in the similar handshape, is enhanced by making the final position of one sign coincide with the initial position of the sign following it, without the usual blurred transition or "wasted" movement between signs.

In additional poems we have analyzed there are also other ways of creating a flow—a continuity—of signs. Some of these involve blending consecutive signs; occasionally one finds a distortion of a sign in the form of the substitution of one prime of a formational parameter for another so that, for example, consecutive signs maintain similar handshapes, even if the citation forms of the signs are different. In art-sign we have also found other ways that signers manipulate what would normally be the transition between two signs; i.e. prolonging a handshape throughout a transition, prolonging the handshape and movement of a sign, anticipating a handshape and place of articulation, etc. This does not exhaust the means of creating a continuity or flow of movement between signs.

External kinetic superstructure. There is yet another type of external structure which we will consider, and that is external kinetic superstructure. We consider this somewhat analogous to the combination of melodic and poetic structure which occurs in songs. The melodic structure is superimposed on the words which may as a result undergo certain kinds of distortions from the point of view of the linguistic code, though aspects of melodic and poetic structure may coincide and interact as well.

In the single line of poetic signing under consideration, it may be a little difficult to separate clearly the superimposed kinetic structure from some of the other principles we have discussed. If one looks at the flow charts of the movement of the hands (Plate VI below) in the non-poetic and poetic styles of signing that one line, it becomes clear that in the latter style there has been a further distortion of the signs which creates an enlarged pattern of movement. This is enhanced by other types of distortions we have discussed (such as those eliminating "wasted" movement in transitions), but this further, grosser distortion clearly seems an aim in its own right as well. Bragg has superimposed a special *design in space* on the signs chosen for the poetic style of signing, a design in space characterized by large, open, non-intersecting movement as shown on the right in Plate VI.

Thus we have illustrated three principles of poetic structure in examining closely one poetic line, and the way in which it has been molded, shaped, and changed in passing from non-poetic straight signing to poetic art-sign. There is *internal poetic structure* involving the choice of signs—in this case, perhaps, an analogue of alliteration. There is *external poetic structure*, involving a balance between the hands (by alternating hands in making one sign after the other and by holding one sign while making another) and involving a flow of movement, a continuity from one sign to another throughout the line (distortion of the transition between signs, in this case making the final position of one sign coincide with the initial position of the next). And there is *external kinetic superstructure*, having to do with creating a design in space, superimposed on the signs themselves.

We have found such principles occurring quite generally in the poetic signing of the members of the National Theater of the Deaf and also in the art-sign of other poet-signers. There are of course other principles of poetic signing which happen not to be represented in this one line. For further analysis of art-sign see Klima and Bellugi (1979).

Clearly there is developing now a rich and fascinating tradition of poetic style in American Sign Language, highly sensitive to the special characteristics of a visual-gestural language and to the possibilities inherent in performing in a visual-gestural mode.

NOTES

[1] This research was supported in part by National Science Foundation Grant GS 42927X and by National Institutes of Health Grant NS 09811 to the Salk Institute for Biological Studies. Our thanks to the many deaf people who have furnished us with examples of the sign-play presented in this paper in the course of our research.

[2] Our experience in communicating with deaf people certainly contradicts Tervoort's claim. The usage of signs in ironical or metaphorical ways occurs frequently and freely. These special uses of signs can often be recognized by very slight changes in the manner in which they are produced.

[3] We refer to the particular values of the major parameters (Hand Configuration, Place of Articulation, Movement, Point of Contact) as the primes of each of those parameters. Thus, the pointing index hand—a "G" hand—is one prime of the parameter Hand Configuration.

[4] Robbin Battison furnished this example.

[5] Among those who have helped us by discussing and creating poetry for us on videotape are: Bernard Bragg and Lou Fant, both of whom have spent many sessions with us in our work; also Jane Wilk, Linda Bove, Pat Graybill, Joe Castronovo, Ed Waterstreet, and others. Members of our research group (either deaf or hearing people of deaf parents) have also shared in interpreting, performing, and discussing poems, including Bonnie Gough, Carlene Pedersen, Ted Supalla, Sharon Neumann, and Shanny Mow.

[6] The sign SINCE is a direct translation of the English word since, but its use in ASL would be restricted to the temporal sense.

[7] In a study of more than 2,000 signs of American Sign Language, we found that only 35% involve the use of both hands where both hands are active. About 40% of the signs are made with one hand only, and another 25% are made with one hand acting on the other hand which remains stationary as a base. Thus for almost two-thirds of these signs, one hand is used as the dominant hand.

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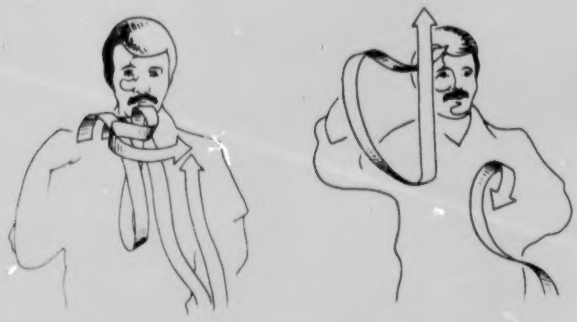

NON-POETIC STYLE

POETIC STYLE

PLATE VI: FLOW CHARTS OF SIGNER'S MOVEMENT

PART ONE: 5

CROSS-CULTURAL COMMUNICATION WITH FOREIGN SIGNERS: FACT & FANCY

Robbin Battison
I. King Jordan

According to popular belief, sign language is very different from spoken language in several ways. Many people believe that the signs of sign language are always iconic; i.e. that sign language is a "picture language". Others believe that sign languages have no grammar, no "proper" ways of expressing things, but merely "throw together" gestures and pantomimic actions; or they believe that sign languages abridge and corrupt correct spoken language grammar. These myths have been treated in recent years by other researchers, who find that the formal structures and communicative functions of sign languages used by deaf people are comparable to those of spoken languages used by hearing people (Stokoe 1960, 1970; Woodward 1973; Battison 1974; Bellugi & Klima 1975; Baker 1975; Frishberg 1975; Chapter Five, above; Liddell 1975; Padden & Markowicz 1975; Stokoe & Battison 1975).

What we choose to examine in this study is the global and international nature of sign language. We shall examine briefly some popular beliefs or myths about sign language in the world, formulate some questions for study and research, discuss some past work, and present some of our own research findings relevant to these questions. We will deal with some very basic questions about the nature of sign languages used here in the U.S. and in other countries. We will certainly not exhaust the topic, since our own investigations are limited in scope and duration, and are still continuing.

Popular beliefs. There are two related popular beliefs about sign languages on a global scale: (1) Sign language is universally the same throughout the world; (2) Deaf signers everywhere have little or no difficulty understanding each other. Naturally if the first statement is true, the second must be true also, but not vice-versa. What we would like to do is break down both these beliefs into statements which can be shown to be true or false.

These beliefs are directly evident in the things that people write and say when they discuss sign language, and indirectly in the manner of their discussions. Consider such innocent things as the word the. It was especially popular in the 19th century to include "the sign language" in titles of books and articles written on deaf communication, and the practice has even continued into the 20th century. We can cite Long (1918), The Sign Language, and Michaels (1923), A Handbook of the Sign Language of the Deaf. The misleading implication of these titles and many others like them is that there is only one sign language. A very observant writer of the 19th century, Garrick Mallery, even stated that the sign language of Indians and of deaf people and everyone else "constitute together one language--the gesture speech of mankind --of which each system is a dialect" (1881: 323).

Berthier, another 19th century writer, who was deaf himself, made a statement typical of his time: "For centuries scholars from every country have sought after a universal language, and failed. Well, it exists all around, it is sign language" (1854: 5).

Michaels proposed a somewhat more moderate position: "The sign-language is universally used by the deaf people, and though all nations do not use the same mode of signs, one having a knowledge of the signs herein delineated will experience little, if any difficulty in understanding other modes, and of being understood by those who use a different mode" (1923: 6f).

Even in very recent years, scholars have made proposals that sign language could become a universal language for all of mankind in principle— although no concrete analyses or proposals have recently been made.

There is abundant evidence that deaf signers themselves believe in the universality of sign language or at least in its potential easily to become universal. One can cite the efforts of the World Federation of the Deaf in creating a 323-item list of signs, primarily designed for use during international meetings (Magarotto & Vukotic 1959), and the more recent international sign language Gestuno (1975). A list of signs designed by a committee, however, should not be confused with a sign language.

There are also many stories circulating among deaf people regarding communication with foreign signers. The main elements of these stories seem to be that: (1) Deaf people communicate with deaf foreigners better than hearing people do with hearing foreigners; (2) Deaf people throughout the world are united by one basic sign language; (3) Sign Language will eventually become a world language for everyone, both deaf and hearing.

Issues. Of course, there is also information which contradicts these beliefs, and this is one of the things that initially guided us into the present study. After considering the many things people say and write about the issue, we formulated a basic set of questions:

1. Do deaf people around the world use the same signs?
2. Can signers understand each other's sign languages?
3. Can signers from different countries communicate with each other even if they don't know each other's sign languages?
4. Do signers have a clear idea of the separateness of different sign languages, or do they feel and act as if they are all basically the same thing?
5. What attitudes do people have about their own sign language and about foreign sign languages?

While some of these questions seem to overlap, the distinctions will become clear in the discussion which follows.

Procedure. From a number of sources, we began to collect information on interaction with foreign signers, including: (1) published material on the subject; (2) Interviews with both American and foreign signers about their own language background and experiences; (3) Our own observations of and participation in sign conversations involving American and foreign signers; (4) Videotaping unstructured conversations among foreign signers; and (5) A referential communication experiment by Jordan & Battison (Sign Language Studies, 1976).

Most of these activities took place in July and August of 1975, when several thousand foreign deaf signers visited Washington, D.C., primarily in order to attend the 7th Congress of the World Federation of the Deaf. We also had ample contact with foreign students attending Gallaudet College, which primarily serves deaf students, and with Americans who had travelled abroad or who had interacted with foreign signers during the W.F.D. meetings. Whenever possible the longer of these interviews were videotaped.

A total of 53 interviews were conducted with people from the following 17 countries: Australia, Canada, Denmark, Finland, France, Germany, Great Britain, Hong Kong, India, Italy, Malaysia, Mexico, Poland, Portugal, Sweden, U.S.S.R., and U.S.A.

Findings. The first question, concerning the uniformity of signs throughout the world, is easy to answer, because there is much published information on the specific individual signs used in various countries. Some of the many available dictionaries include: American (Stokoe et al. 1965), French (Oléron 1974), Australian (Jeanes et al. n.d.), British (British Deaf & Dumb Association 1960), Swedish (Bjurgate & Nilsson 1968), American Indian (Mallery 1881 [1972]). See also Bornstein & Hamilton(1972). From examining these dictionaries it is evident that there is a great variety of signs used by people to denote the same thing. Signs are not uniformly the same throughout the world, nor are they necessarily standardized within many countries.

One example we can offer to show this variety is from a comparison of French and American signs done by Woodward (1976). He performed a detailed comparison of the 872 signs in a recent French dictionary (Oléron 1974)[1] with current American signs. One would expect a high correspondence between these French signs and American signs for two reasons: (a) French and American Sign Languages are historically related--they share a common ancestor, and (b) Oléron purposely chose for his dictionary those signs which are most easily explainable in "iconic" and "pictographic" terms (Woodward, personal communication), and thus one would expect more correspondence between American and French signs simply because with the more "iconic" signs there would supposedly be less chance of arbitrary symbolism entering into the formation of the signs and creating a difference. What Woodward found in his comparative study was that in spite of these two conditions (the historical relationship and iconic signs), there was only 26.5% shared vocabulary; i.e. only 26.5% of the signs were highly similar or identical in both the French and the American versions. Of course the question of mutual intelligibility does not depend solely on the amount of shared vocabulary, since mutually intelligible dialects of the same language may have a great many lexical differences, and vice-versa.

As a concluding note on this question, it should be noted that earlier researchers on these problems sometimes emphasized (and perhaps exaggerated) the similarities between sign languages rather than noting their (random or systematic) differences. Sometimes the nature of the similarity and the total number of signs involved in the comparison were vague. For example in speaking of deaf signs and Plains Indian signs, Mallery says simply, "Many of them show marked similarity, not only in principle[2] but often in detail" (1881: 323).

Let us take up the next two questions simultaneously, for the evidence bears on both of them: Can signers understand each other's sign language? and Can signers from different countries communicate with each other even if they do not know each other's sign languages? We would like to keep these two questions separate, because communication can take place without sharing a natural language--through mime or nonverbal communication, for example.

We quoted Mallery earlier as saying that the signs of Indians, deaf people, and everyone else really made up one language; however, he later notes that not all Indians can understand each other's signs (1881: 82, 86-90 passim.). What Mallery meant by language in these contexts is hard to determine, as he never attempts a concise definition. Certainly he missed one of the basic distinctions between Indian and deaf sign languages--that deaf sign languages are learned by some deaf children as native or first languages, and must necessarily serve all the social functions of a complete language; whereas Indians primarily used signs with people who did not speak the same language, and in limited social situations like hunting, trading, etc. Interestingly, though Mallery discusses at length the signs of both Indians and deaf people, nowhere does he mention deaf Indians and how they might have used signs.

Let us go back ninety-five years to an early experiment in sign communication that took place in Washington, D.C., on March 16, 1880.[3] Colonel Garrick Mallery brought seven Ute Indians to Gallaudet College, where they met with seven deaf students, the college's president, E.M.Gallaudet, and a number of the staff. A "testing procedure" was used in which the two groups, Indians and deaf signers, alternated telling each other individual signs and connected narratives. Mallery describes six of the short narratives and describes seven of the "signs" in detail.[4]

Interestingly, four of the seven "signs" he describes were not understood. The six short narratives were understood without much difficulty, although it is apparent that much of it was simply miming scenarios involving hunting, gathering food, and eating specific foods. Two examples will illustrate the ad hoc nature of the communication on that day:

> Among the signs was that for squirrel, given by a deaf-mute. The right hand was placed over and facing the left, and about four inches above the latter, to show the height of the animal; then the two hands were held edgewise and horizontally in front, about eight inches apart (showing length); then imitating the grasping of

> a small object and biting it rapidly with the incisors, the extended index was pointed upward and forward (in a tree).
>
> This was not understood, as the Utes have no sign for the tree squirrel, the arboreal animal not being found now in their region (1881: 321).

We need only point out two things: (a) The supposed "sign" was really a sequence of at least four separate mime elements; (b) The Utes probably did understand what was being described (not named)--a small arboreal animal which gathers and chews small objects.

The second example indicated another weakness in these experiments. Despite Mallery's expertise in observing, collecting, and describing gestural communication, he neglected to fully take into account the effects of social context on intelligibility:

> When the Indians were asked whether, if they (the deaf-mutes) were to come to the Ute country they would be scalped, the answer was given, "Nothing would be done to you; but we would be friends," as follows:
>
> The palm of the right hand was brushed toward the right over that of the left (nothing), and the right hand made to grasp the palm of the left, thumbs [sic] extended over and lying upon the back of the opposing hand.
>
> This was readily understood by the deaf-mutes (1881: 322).

We are not given the details of the students' interpretations of these two signs, but we can reasonably assume that the Utes were expected to say something of a friendly nature, thus it is not surprising at all that the students "readily understood" them. A report of a more modern experiment is given in Jordan and Battison (1976).

But now let us move to more recent events with other transported signers. From our interviews with deaf signers from America and other nations, we obtained a range of self-reports on communication with members of other deaf cultures. First, examining the question whether sign languages are understood by foreigners, we have the following information:

1. A German actor, whose company performs in mime (not in any variety of German Sign Language), complained that one of the reasons they could not perform a stage show in their own sign language was that they would not be understood when they travelled to other German cities.
2. A young woman from Lyons reported that she refuses to visit Paris without her friend who has been to Paris more often and understands the Parisians' sign language better--Lyons and Paris are 250 miles apart.
3. A standard story, repeated by travellers and natives alike, holds that if you travel 50 miles in Britain you will encounter a different sign language that cannot be understood in the region you have just left.
4. An Italian and a Pole who have both travelled widely were in a casual conversation with five Americans. They made no attempt to imitate or use American signs; they stated flatly that they did not understand American signs; and they relied the entire time on an American who was skilled in using international signs and signs from various European countries.
5. From Swedish, Danish, and Finnish informants we learned that the four Scandinavian countries have separate sign languages, but that people from Sweden, Denmark, and Norway can undertand one another with only moderate difficulty. On the other hand, interaction between Danes and Finns frequently requires the use of an interpreter.
6. An American who has a reputation for being a highly skilled communicator reported that when he was with the Israeli groups during the W.F.D. Congress: "They signed so fast, I felt like I was hearing!"[5]
7. Both an Australian learning American signs and a Dane learning Finnish signs reported that their comprehension of the new language exceeded their abilities to express themselves correctly in it. The Dane said, "After many visits, I can understand it with almost no problem, but I can't sign it myself." The Australian said, "I don't feel comfortable using ASL; I can understand it, but not express myself."

What we conclude from these reports and others like them is that: (a) Not only do people use different signs in different parts of the world but also these signs are largely unintelligible to foreign signers when used in connected discourse; (b) Geographical boundaries of sign language intelligibility do not always correspond to the boundaries of spoken languages--while many of the deaf in Scandinavia can understand one another with only moderate difficulty, we also have the opposite situation, that cities or regions within small countries (e.g. Britain, Germany, France) determine linguistic boundaries;[6] (c) As with spoken languages that are learned informally (in a normal communicative situation rather than in a classroom), comprehension of a second sign language surpasses correct expressive usage of that language.

Now we shall again take up the question Whether deaf signers can communicate with each other, and if so, how?

Most of our non-American informants, particularly the Europeans, say that communication with foreign deaf people is not a problem. Depending on past experience and amount of interaction with the foreigners, most people say that after two or three days they can understand each other pretty well.

This does not at all contradict the previous findings that sign languages are unintelligible to foreigners, because, when asked specifically about how they communicate with foreigners, many of them say specifically that they stop using their own sign language and start using mime and gesture. Other features of such communication are that it is slower than signing, very repetitious, and involves a lot of back-and-forth bargaining and checking about the meanings of various gestures. Gradually, a shared meaning for various signs emerges through the conversation. The composite description of cross-cultural communication matches Mallery's (1881) very insightful discussion of interaction among different tribes of Indians.

The general consensus of our well-travelled informants was that this type of communication is a skill that can be improved with the experience of a great deal of foreign interaction. The communication may be augmented by other means: E.g. using agreed-upon international signs, fingerspelling familiar words from a spoken language, speaking occasional words which are thought to be well known. In this preliminary report we shall not attempt a detailed description of how these cross-cultural communications take place, but we would like to consider briefly the factors of topic, situation, and motivation.

Many contacts between deaf foreigners take place when people are travelling, and are therefore concerned with the basic necessities of food and shelter. Also, when meeting foreigners for the first time, much basic personal and social information is exchanged--Where are you from? What do you do? Are you married? Is your husband with you? Where are you going next? Etc. etc. In other words, there is a high expectancy that certain topics will come up again and again before interaction is allowed to move to more intricate and less superficial interactions.

Motivation is higher in these interactions, partly because when one is tired, cold, hungry, or bored, one tries very hard to alleviate these situations by establishing communication with those who live in the area. A consensus among our informants was that it is difficult to discuss very weighty or "deep" subjects with foreigners. Politics, religion, and philosophy are difficult, while travel, food, school, jobs, family, and entertainment are much easier. Also, it is much easier to discuss things in a dyad than in a larger group. One other motivational factor which may contribute to successful communication is the patience and perseverance of deaf people, most of whom have a great deal of practice dealing with weak communicative situations involving hearing people.

Moving to the fourth question: "Do signers have a clear idea of the separateness of different sign languages, or do they feel and act as if they are all basically the same?"--most of the evidence says they do keep languages separate in spite of the fact that an extensive mixing of languages and styles takes place when in contact with foreigners.

The evidence regarding this separateness is of five kinds:

1. When native signers (those with deaf parents) are asked what their first language was, they almost always answer, "Sign Language"--not Swedish Sign Language or French Sign Language, or any other national or regional type. It seems as if they are underdifferentiating or confusing various sign languages that they know (or know about), but when pressed further, they make it clear that it **was** a sign language, as opposed to a spoken language, that they learned first.

2. Some signers in America tend to think of all European sign languages as being vaguely the same entity and are often surprised at the complexity and differences among European sign languages; while Europeans themselves are more experienced with languages. We have two illustrations of this contrast: (a) In the course of introducing a Dane to some Americans, the Canadian introducer used a few Danish signs. One of the Americans remarked to him, "Oh, you know International Sign Language!" (b) A European teacher of the deaf, who is deaf himself, spent a year as a graduate student at

Gallaudet. An American student asked him if he planned to take American Sign Language back to his country. The teacher looked surprised and said, "No, what for? We have our own sign language in my country." The student was astonished. Prior to his departure for the U.S., the same teacher had announced to his class of ten-year-old deaf pupils that he was going to America for a year of study. The class erupted with expressions of dismay. When asked why they thought it was so terrible, the pupils answered, "Because you'll have to learn American Sign Language!" These European youngsters, who had seen many foreign deaf people come and go, had a clear idea of the separation of different sign languages; while the older American college students did not.

3. We have two other major kinds of evidence to show that people keep their sign languages "separated." The first involves people who move to a different country. By all reports they forget their own signs rapidly as they acquire the sign language of their new country. We can report only one exception to this, a Finnish woman who moved to Denmark. Other foreigners in Denmark were surprised that she retained her native Finnish Sign Language.

4. It is also interesting to note what happens when one of these expatriates has visitors from his native country. All of them report that they have difficulty readjusting to their first language and that it takes several days of interaction with their guests before they begin to feel normal. They also report that they can understand but not express themselves very well in these situations.

5. Another type of evidence which shows that signers are capable of keeping their languages separate is what happens when a multilingual person mistakenly substitutes one language for another. We can illustrate this with an event which occurred two separate times: Two Finns, a Dane, and an American were travelling in a car. The two Finns were father and daughter and were having a conversation in Finnish Sign Language. The Dane was multilingual and attempted to interpret from Finnish to American signs for the benefit of the American. However, in the confusion he started signing to the American in Danish signs, and went on like that for a minute before the American stopped him and asked him to interpret into a language he could understand!

Attitudes. Finally let us consider attitudes toward language and language users. Since much of our material on language attitudes is from European signers collected during a three-week period in the United States, these generalizations are not without limitations.

Europe consists of many small countries whose deaf people interact extensively through travel and emigration. The United States is large, relatively homogeneous, and linguistically isolated from the rest of the deaf world. Possibly because of this isolation, deaf Americans seem to mirror the language attitudes of the American hearing majority culture. This involves ethnocentrism, language chauvinism, and linguistic naïveté.

Europeans claim that Americans are rigid and inflexible in their language and hard to understand. One deaf couple from Europe had to resort to pencil and paper to communicate with deaf people when they first arrived in the U.S. They could make themselves understood, but could not understand the Americans when they signed, because they claimed, the Americans did not modify their language or slow down at all.

There were several reports of American students being surprised that foreigners had different sign languages, and also that deaf people needed interpreters to go from one sign language to another. When asked how foreigners communicate with each other, Americans would describe their communication with labels like "home signs", "all pictures", "basic gestures", "mime", and "poor sign language". Europeans who knew about these American attitudes suggested that the Americans were not judging them on their own national sign languages but on the gestures and mime that they used when communicating with foreigners.

To illustrate how language-related attitudes can affect cross-cultural interaction, we offer the following story of two foreign deaf students at Gallaudet College. Although they came from two separate countries, they had very similar backgrounds. Both were profoundly deaf, had deaf parents, and were native signers of their own national sign language. They learned English before arriving in the United States, and they had an excellent command of written and spoken English. Possibly because of this prior knowledge, and possibly because they first were exposed to American signs in a classroom, they used American signs with English syntax, just as most hearing people do. As a result, the other students thought they were either hearing or orally-oriented, awkward signers. The American students were not willing to believe that they had deaf parents, because they did not sign like the children of deaf parents should. Because of this "suspicious" behavior, one of these foreign students was falsely labelled as a narcotics agent and briefly ostracized.

Mistaken identity worked the other way, too. In spite of the fact that they had been signing all their lives, several foreign students said they could not distinguish deaf Americans from hearing Americans on the basis of their signing, for the first six months or so. To them, "Everyone signs the same."

For the European visitors during the W.F.D. Congress, America was full of pleasant surprises also. Most of them were awed by the fact that people from California could really understand people from the East Coast without any problems, and that the U.S. had a truly national Sign Language. Many people from the European drama troupes, all of whom perform in mime, dance, and gesture, were astonished at the National Theater of The Deaf's performance in American Sign Language. Several of them had previously commented that a play in real sign language would be impossible to stage. And finally, many Europeans commented on how well sign language was accepted here in the United States--it was used in the schools; hearing people learned it; and deaf people could sign on the street and not feel ashamed. These people were surprised, since these contrasted with their own experiences in their own countries.

Conclusions. We have established and examined a number of questions relating to sign language communication between deaf people from different countries. From personal interviews and observations we can suggest partial answers to some of them.

From examining some of the many sign language dictionaries available and from our records of communication with deaf foreigners, we do know that signs vary considerably from country to country. This much is certainly not in dispute.

From the personal reports of travellers and immigrants alike, we know that sign languages are not understood by signers who are not familiar with them--certainly not as easily understood as some stories would have us believe. Comprehension of a second language exceeds correct expression in that language; receptive skills exceed expressive skills.

The fact that deaf signers can and do communicate despite not sharing the same sign language is interesting, and it bears more investigation. While being skilled in sign language may prepare one for dealing with mime and for communicating in difficult cross-cultural situations, the two should not be confused. Signers consider them separate tasks.

The data we have gathered gives us little reason to believe that sign languages are much different from spoken languages as regards cross-cultural communication. To the extent that sign languages are separate entities, communication is hindered between groups. We need more information about the limitations and potentials in communication between foreign signers. We also feel that there is a need for intensive linguistic investigation of national sign languages everywhere.

NOTES

[1] The signs in Oléron (1974) are taken from the same corpus of data Oléron examined twenty-two years earlier (1952).

[2] We interpret Mallery's "in principle" to mean that the general image evoked by the sign is the same, but not necessarily the actual formation of the sign. This is another example of the notion of iconicity clouding the investigation of formational structure.

[3] Mallery gave the date as March 6 (1881: 321). It is identical of course in the facsimile reprint of 1972. The date, however, for the event given in E. M. Gallaudet's diary is March 16, undoubtedly the more reliable dating.

[4] Seeking corroboration of Mallery's account of the meeting, we looked in the Gallaudet College archives at the personal records of E. M. Gallaudet. Apparently the event was not as impressive to him as to Mallery; his diary entry that day is:

> March, Tuesday 16. 1880
> Cold raw day, a little rain. We had a visit
> at the Inst.[itute] from Col. Mallery
> & a party of Ute indians [sic]. I took a
> Fr.[ench] lesson. Called on Mr. W. K. Rogers
> the Prnts. [Pres. Rutherford B. Hayes'] Pri. Sec.
> Rev. John Chamberlain of N.Y. arrived & was
> quartered at the inst.

In his report of the event Mallery records the names of none of the deaf students but names five of the Indians.

5. In other words, he was made to feel like an average hearing signer, who always has great difficulty following a normal deaf sign conversation.

6. One might begin to look for an explanation for these geographic discrepancies in national attitudes toward sign languages. The two groups of countries named are at extreme ends of a continuum as regards public and educational acceptance of signing among deaf people. Signing in public and in schools is becoming widely accepted in Scandinavia, while it is forbidden in schools and heavily stigmatized and suppressed in many countries of the world. One could argue that the public and institutional acceptance of signs has a standardizing influence, since people communicate more freely under these conditions and tend to interact over social and regional differences and in a greater variety of situations.

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PART ONE: 6

VERBS IN AMERICAN SIGN LANGUAGE

Susan Fischer
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What is a verb?

Important for the study of any language is precise knowledge that something is a verb and that other, similar things are not. In American Sign Language (ASL), there are clues different from those in English for deciding that something is a verb. One major clue is inflection for person, but in ASL this process is more general than it is in many languages. Although many, but not all, ASL verbs have distinct forms for first, second, and third persons, it is not the subject person only that is so indicated; also, and indeed more often, the object, source, goal, and other arguments of a sentence affect the form of a sign verb. Almost three-fourths of the verbs we investigated for this study behave in this way. The only other parts of speech that behave at all similarly are personal pronouns, but there is difference between these two classes, verbs and pronouns.

The horizontal angle made by the signer's forearm distinguishes the ASL pronoun forms that mean 'you two' and 'the two of them'; it also distinguishes the ASL verb form in 'I give you' from the verb form in 'I give them.' Straight ahead for second person and obliquely out for third, the forearm extended moves slightly side to side for these two pronouns; it extends as it rotates for the verb forms. Now, the pronouns for first and second person are formed by direct pointing with the index finger. The form of the verb in 'You give them' requires swinging the forearm from straight away to obliquely away as the rotation is done. Thus, it can be seen that the person indicated determines the pronoun form, but both subject and indirect object of a verb like GIVE determine the verb form in ASL.

A second major clue to knowing a sign verb is context. If it appears between two noun signs, it is probably a verb; if it follows an auxiliary, it may be a verb; but like English have, some ASL auxiliaries can also be main verbs. They can also leave the addressee to supply a common verb appropriate to the object. If no one verb fits, the sentence is ungrammatical. In the following examples, the verb that the addressee must read in is underlined:

(1) IF YOU WANT SEE DENTIST, YOU BETTER APPOINTMENT.
'If you want to see the dentist, you had better make an appointment.'
(2) ME CAN'T MOVIE NIGHT, MUST ALGEBRA.
'I can't go to the movies tonight; I have to do algebra.'
(3) *ME CAN'T AFRICA. (Too many choices of verb)
(4) THAT BOY WILL DOCTOR.
'That boy will become a doctor.' (or in context)
'That boy will go to the doctor.'
(5) SHE CAN'T APPLE.
'She can't eat apples.'
(6) HE CAN'T VACATION NOW YEAR.
'He can't take a vacation this year.
(7) YOU SHOULD CUP.
'You should use a cup.'
(8) ME MUST PARTY.
'I have to go to a party.'
(9) *HE WILL DEER. (Too many choices)
(10) THAT t-a-d-p-o-l-e WILL FROG.
'That tadpole will become a frog.'
(11) *RECENTLY THAT TOWN ELECTRICITY. (Too many choices)
(12) *ME WILL HEARING-AID TOMORROW. (Too many choices)

All of the unstarred sentences are acceptable, even as the first utterances in a discourse. The starred ones and others like them cannot begin discourse but may be acceptable if the missing verb has been established as a topic. Thus, in a conversation about buying things, (12) would be acceptable and its verb understood as 'buy'.

Nouns strongly affect the acceptability. If a noun can occur as the object of only a limited number of verbs, then omission of one of these verbs is grammatical. Although our native informant says that the signs after the auxiliaries in the sentences above are nouns, and although we may be claiming that a verb is deleted by the signer and read in by the addressee, we must show that the items after the auxiliaries really do function as nouns. Let us consider eight of the examples (1,3,4,6,7,8,11,12), omitting those that deal with becoming. If we can insert a quantifier of the kind that occurs only with nouns without changing the sign's meaning, we can be fairly sure our claim is correct. The quantifier TWO serves this purpose admirably, since it cannot occur with verbs:

(13) * ME MUST TWO GO. (14) * SHE CAN'T TWO LAUGH.

But there is an adverb, TWICE, that goes exclusively with verb phrases:

(15) ME MUST GO TWICE. (16) SHE CAN'T LAUGH TWICE.

What then about the nouns to be tested?

(18) YOU BETTER TWO APPOINTMENT.
'You had better make two appointments.'
(19) SHE CAN'T TWO APPLE.
'She can't eat two apples.'
(20) YOU SHOULD TWO CUP.
'You should use two cups.'
(21) ME MUST TWO PARTY.
'I have to go to two parties.'
(22) HE CAN'T TWO VACATION NOW YEAR.
'He can't take two vacations this year.'
(23) ME CAN'T TWO MOVIE NIGHT, MUST TWO LESSON.
'I can't go to two movies tonight; I have to do two lessons.'

All these sentences are indeed grammatical, and the only difference in meaning is the quantification of the nouns. All these sentences can occur with TWICE as well, but then it is the whole verb phrase that is modified. Sentences (4), (9), and (10) are more difficult to test with a quantifier:

(24) * HE WILL TWO DOCTOR.

However, if one can find a plausible context, this sentence becomes acceptable:

(25) HE WILL TWO DOCTOR, DENTIST AND SURGEON.
'He will become two doctors—a dentist and a surgeon.'

We can show that in other contexts DOCTOR is indeed a noun, but this next problem makes this kind of sentence a class by itself. BE is a sign of ASL, but it tends to be used either for emphasis or for signing English; i.e. using signs as words to write, as it were, English sentences in the air. This is not at all the same thing as signing ASL. In the former one uses signs as substitutes for English words and follows all the requirements of English grammar; in the latter one uses signs as the words of ASL and uses the grammar of this language. The normal way to sign in ASL the meaning 'He is a doctor' is

(26) HE DOCTOR.

If one signs instead

(27) HE BE DOCTOR.

The meaning is, 'He really is a doctor.' Thus (4), THAT BOY WILL DOCTOR simply differs from the English way of using a copula in the normal way of ASL; its inchoative sense can be inferred from the time frame (WILL). There is so far no way of deciding whether BE or BECOME needs to be read in.

Besides inflection and context, a third way to decide whether something in ASL is a verb is the intuition of the native signer. If our informant feels that DOCTOR is a noun and not a verb, even though there is an implicit verbal feel in a sentence like (4), this is a valid piece of evidence. If she says that NO is a verb, and not always an interjection, and if she or we can show how it is used as a verb, then we are justified in taking the informant's judgement as accurate.

Mutability of ASL verbs. Having established what signs are verbs and what signs are not, we proceeded to investigate the mutability of verbs in American Sign Language. We prepared a list of verbs by picking out of The Dictionary of American Sign Language (Stokoe, Casterline, & Croneberg 1965 [1976]) any verb that had more than one page number referred to in the index. Then in the body of the dictionary, we picked out all the verbs for which alternate forms were given by the entries. The verbs so selected are shown in Table 1.

We went over each item with our informant, asking various questions about mutability (categories will be discussed below). It turned out that some of the items were not verbs; others were indistinguishable from verbs elsewhere in the list (i.e. were two different glosses for one sign); and also two or more signs were covered by one gloss (e.g. SAVE names two verbs, one for keeping, the other for rescuing). What follow are the matters we took up with our informant for each item:

1. Strict subcategorization—How many and what kinds of syntactic categories the verb occurs with; e.g. [NP___#] for an intransitive verb.
2. Selectional restrictions—Semantic restrictions on the above categories; e.g. [+Anim___].

Table 1. The list of ASL verbs investigated.

ARGUE
ARRIVE
ASK
BITE
BLAME
BLEED
BORROW
BRIBE
BRING
CATCH
CHANGE
CHEAT
CHOOSE
CLASH
CLOSE
COME
CONNECT
CONVERGE
CORRESPOND
CRASH
CROSS
CUT
DANCE
DECIDE
DEFEAT
DEFLATE
DEPOSIT
DESIRE
DISAGREE
DISAPPEAR
DISAPPOINTED
DISOBEY
DIVE
DIVORCE
DO
DON'T CARE
DRESS
DRINK
DRIVE
DROP
ELIMINATE
ENJOY
GET-EVEN-WITH
EXCHANGE
EXPECT
FACE
FALL-OFF
FEAR
FED-UP
FEED
FIND
FINISH
FLATTER
FLY
FOOL
FORCE
FORSEE
FREQUENT
FRIGHTEN
GET-TOGETHER
GIFT
GIVE
GO
GOSSIP
HATE
HAND
HEAR
HELP
HIT
HOPE
INFORM
INJURE
INSULT
INTERESTING
INVITE
IRON
JOIN
KICK
KISS
LAUGH
LEAVE
LECTURE
LET
LIE
LIKE
LOCK
LOOK
LOSE
LOVE
MEAN
MINGLE
MISS
MIX
MOOCH
MOVE
OPEN
OPERATE
PAIN
PAINT
PASS
PICK-UP
PITY
POSTPONE
PRACTICE
PRAISE
PREACH
PULL
PUSH
RAIN
REBEL
REDUCE
REFUSE
REMEMBER
REMOVE
REST
REVERSE
RIDE
RIDICULE
RISE
RUN
SAVE
SAY-NO
SCOLD
SCRAPE
SEND
SHINE
SHOOT
SHOP
SHOW
SIGN
SIT
SKATE
SMILE
SMOKE
SNOW
SPELL
SPOIL
STAND
STARVE
STAY
STRETCH
STUDY
SUBSCRIBE
SUFFER
SUPPORT
SUPPRESS
SURPRISE
SWALLOW
SWEAR
TAKE-PICTURES
TAKE
TALK

TEACH
TEASE
TELEPHONE
TELL
THROW
TRANSFER
TRAVEL
TURN
TWIST
UPSET
USE
VISIT
WADDLE
WALK
WASH
WIN
WORK
WORN-OUT
WORRY
WRITE
ZOOM-OFF

3. Directionality—Whether the verb moves in the direction of one or more of its arguments, and if so which; e.g. SEE is directional between subject and direct object.
4. Incorporation of location—Whether the verb sign is performed closer than neutrally to the location, real or established, of the referent of one of its arguments.
5. Reversibility—Whether the orientation of the hand(s) changes depending on the location of arguments; e.g. SEE is [-Reversible]; LOOK is [+Reversible]; and OWE is also [+Reversible] but not directional.
6. Incorporation of size and shape—Whether the verb sign changes its handshape, location, and/or movement to reflect the size and/or shape of any of the referents of any of its arguments; and which arguments are so affected; e.g. REMOVE can incorporate the size and shape of the source, direct object, goal (perhaps), and instrument.
7. Incorporation of manner—Whether the action of the sign can change intensity or speed to reflect either the manner of the action referred to, the speaker's attitude toward the performance, or the mode (declarative, imperative) of the utterance. (Nearly all ASL verbs can incorporate manner in one of these ways.)
8. Incorporation of number—Whether the verb can undergo fast reduplication with horizontal movement, or other means of indicating plural in an argument; e.g. the number of hands or fingers used. (Any verb positive for this feature is also marked if it cannot form the collective plural by sweeping the hands and/or body around in one performance of the action; see Fischer 1973.)
9. Habitual—Whether the verb can form the habitual aspect by fast reduplication (without horizontal motion), and shows any irregularities in the change of meaning from the base form; e.g. DON'T-CARE is [+Habitual].
10. Continuous (slow reduplication)—Whether it is grammatical to perform slow reduplication to mean 'for a long time'; e.g. FEED is [+Contin]; FEAR is [-Contin].
11. Reciprocal—Whether the verb can (or must) take two arguments that perform the action on each other and appear in the verb sign; e.g. GIFT allows reciprocity; HEAR does not, in TWO HEAR EACH-OTHER; EXCHANGE requires reciprocal.

12. Reflexive—Whether the sign can change to show a distinction between, e.g., I (verb) MYSELF and SOMEONE (verb) ME, the verb is reflexive; LOOK is [+Reflex].

Strict subcategorization rules. In this section and the next, we will concentrate on the differences in the way the verb sign and the English word used to gloss it behave. The major syntactic difference, in general, is that many English intransitive verbs seem to be transitive in ASL, and conversely that some English transitive verbs can be intransitive in ASL. There are two major reasons for this, accounted for at least partially by the grammar of ASL. First, ASL does not use fillers (enclitics), although some ASL verbs incorporate directional meanings. Thus the sentences in (28) with enclitics underlined are likely to be signed as in (29):

(28)	I arrived in New York.	ME ARRIVE NEW-YORK.
	I went to New York.	ME GO NEW-YORK. (cf Fant 1972)
	John looked at Bill.	JOHN LOOK-AT BILL.
	I am ashamed of you.	ME SHAME YOU.
	George is afraid of spiders	GEORGE AFRAID SPIDER.
	The linguist got even with the government.	LINGUIST EVEN-WITH GOVERNMENT.
	The vase fell off the table.	VASE FALL-OFF TABLE.
	We will not invite her to our party.	WE NOT INVITE-HER OUR PARTY.
	I always laugh at him.	ME ALWAYS MOCK HIM.
	Do you subscribe to Ms. ?	YOU SUBSCRIBE m-s ?

The second reason for differences in strict subcategorization of semantically similar verbs in ASL and English is that some verbs that are intransitive only or transitive only in English may be either intransitive or transitive in ASL, with the general meaning that the transitive is the causative of the intransitive, or that the intransitive is the passive (or middle) of the transitive. We have cases like this in English:

(30) a The door opened.
b The boy opened the door.
(31) a The ice melted.
b The sun melted the ice.

This is somewhat more extensive in ASL:

(32) a HOW MUCH BUTTER LEAVE IN COLD BOX?
'How much butter is left in the icebox?'
b PLEASE LEAVE BUTTER IN COLD BOX YOU.
'Please leave the butter in the icebox.'
(33) a MAN OPERATE FOR CANCER.
'The man was operated on for cancer.'
b DOCTOR OPERATE MAN FOR CANCER.
'The doctor operated on the man for cancer.'
(34) a PICNIC POSTPONE BECAUSE RAIN.
'The picnic was postponed because it rained.'
b WE POSTPONE PICNIC BECAUSE RAIN.
'We postponed the picnic because it rained.'
(35) a BABY SAVE IN BATH, CAN SWIM.
'The baby is safe in the bathtub since it can swim.'
b DOG SAVE BABY.
'The dog saved the baby.'

As these and other examples show, some form of a case grammar might be quite appropriate for describing ASL. This will show up more strongly in our discussion of selectional restrictions.

Selectional restrictions. Strict subcategorization rules are toward the syntactic end of a syntactic-semantic spectrum; selectional restrictions are nearer the semantic end. One might therefore expect the latter sort of rules to be somewhat similar for ASL and for English. While this is by and large true, there are some interesting differences; e.g. in English one can say (36), but in ASL one must sign (37)—the second utterance shown in (37) is not grammatical:

(36) Our new furniture came yesterday.

(37) OUR NEW FURNITURE ARRIVE YESTERDAY.
*OUR NEW FURNITURE COME YESTERDAY.

The verb COME in ASL requires an animate agent. The verb DISAGREE requires human agents; so while (38) is permitted in English, (39) shows that different verb choice must be made:

(38) These two answers disagree.

(39) THESE-TWO ANSWER DIFFER.
... OPPOSITE.
...*DISAGREE.

Similarly, clash can refer to people, personalities, or colors in English, but the ASL verb CLASH can refer only to people:

(40) a Orange clashes with red.
b ORANGE RED CONFLICT.
...*CLASH.

Some other differences: BRIBE implies money; one cannot BRIBE a child with candy in ASL. Three morphologically related verbs meaning 'support' have different selectional restrictions in ASL. The first, made by pushing upward on the passive arm at wrist then nearer elbow with the active hand in fist formation, denotes physical support, often of a large structure. The second, active fist under passive fist thrusts upward (dez and tab 'A' in 'a' or 's' form), selects both human patient and human agent, but the support may be moral or material. The third, which is the second repeated, has the added restriction that the support is monetary. The verb STAY requires an animate agent. If one wishes to sign the equivalent of 'I want the telephone to stay there', one must use LEAVE, not STAY. A verb that seems to be less restricted semantically is FREQUENT, as in 'to frequent a place, go often.' This verb can be used not only with a location, as in English, but also with a person as goal or direct object. The verb glossed SUBSCRIBE really means 'to receive regularly' and is limited to magazines, newspapers, or money—the latter generally in the form of pension or alimony.

The generalization of selectional restrictions is one of the reasons one might wish to opt for a form of case grammar. In such a grammar, the verbs OPEN, CLOSE, FLY, CHANGE, CONNECT, JOIN, DEFLATE, HANG, POSTPONE, SHINE, and STRETCH would have double sets of selectional restrictions, for transitive and intransitive uses, thus the direct generalization about what their patient must be could be avoided; e.g. POSTPONE has two sets of strict subcategorization and selectional restrictions. For the intransitive use these are

[NP___] and +[+Event]___
e.g.: 'I put (it) off' 'Vacation (was) postponed'

For the transitive use of POSTPONE they are

[NP___NP] and [+Human]___[+Event].
e.g.: 'They postponed it' 'He postponed Thanksgiving'

Similarly for SHINE:

intr. [NP___] and [+Concrete]___
tr. [NP___NP] and [+Human]___[+Concr].
e.g.: 'The car shines'
'We shined the shoes'

Directionality. Every language has strict subcategorization rules and selectional restrictions, but the next topics seem to be unique in those languages that are expressed in a gestural modality—not so much as to what the processes indicate but rather in terms of the way they work. The first process, limited to verbs, can be considered a process of incorporating a pronoun (or a case-marking copy of from one to three arguments) into a verb. The pronoun copy is then deleted, leaving behind a trace—the direction in which the sign moves.

The citation form of a verb in ASL is the form with a first person singular subject. If we simply ask our informant to give the sign for a given English verb, she will reply with the form appropriate to use with the signer as subject (and either YOU or some indefinite direct or indirect object). Thus the sign that means 'give (a present to someone)' is made by two 'X' hands moving abruptly away from the signer. For 'I give something to you', the signer completes the sign with smoother action and ends with the hands pointing toward the addressee. If, however, the meaning is 'Someone gives something to me', the motion of the sign is reversed; i.e. the hands move from the direction of the addressee toward the signer. If one wishes to say 'You give something to her', the signer begins the sign from the direction of the addressee and moves it toward the location of the recipient, or the location for her that has been established in the context. Throughout these changes, the handshape of the verb sign remains constant; only the direction of the motion changes to indicate the (location of the) arguments.

Directionality is not varied on a horizontal plane only; it varies vertically as well. If a tall adult is speaking to a small child and wishes to say that (s)he will give the child something, the sign action is not only away from the signer but also downward toward the child. If the situation is reversed and the child talks of giving the adult something, the sign moves upward as well as away from the signer. When verb action is directed toward a person or animal, it is usually the location of the eyes that determines the precise angle of motion. Toward an inanimate object, something like the center of mass seems to be used. Thus, the verb LEAVE ('let something stay', not 'depart') is directional toward its direct object. To make this sign, one flings the spread hands outward from the body up, down, or to the side, depending on the location of the object. Thus, if something is up on a shelf, the sign LEAVE is made upward; but if it is on the floor, the action is downward. (This last verb is also partly locational; see next section.)

GIVE is directional between the giver and the receiver; but LEAVE is directional toward the object left. There are other options for directionality as well. The verb BRING is directional between source and goal. If one wishes to say 'I bring something down from a shelf over to the table', the hands move from high up (in the direction of the shelf) and then obliquely down toward the table. The subject (as agent or doer of the action) is not part of this instance of directionality.

An interesting subset of directional verbs is made up of those that include a body part as an argument. This can be the source, the goal (in a sense), or the direct object. Verbs that involve directionality to or from body parts include BITE, OPERATE (surgery), HIT, BLEED, HURT, CUT, INJECT, REMOVE, SHOOT, and AMPUTATE. If one wants to sign 'I bumped into a door', one must specify with the verb's movement which part of the body made contact with the door. One generally specifies (although there is a neutral form, the hand) the place from which one bleeds. If one describes a mosquito bite, one shows where the victim has been bitten, and so on. Generally these signs (except for SHOOT) involve actual contact with the body.

In summary, directional verbs in ASL change their direction of movement to point toward the locations of various arguments in the sentence. This process, together with reversibility and location (next sections), is most analogous in function to inflection for person in spoken languages. It is more extensive, however, since it inflects the verb for arguments other than subject (agent) and/or direct object (patient); and it is also more specific.

Reversibility. There is another way, partially related to directionality, that a sign verb shows clearly the grammatical relations among its arguments (i.e. the noun parts of its sentence). This is the phenomenon we are calling reversibility. If in addition to or instead of a change in direction of movement in a verb to show who is doing what to whom, there is also a change in the orientation of the hand(s), the verb is reversible, since the hands can reverse or change their orientation. Not all directional verbs are reversible, and there is at least one reversible verb that cannot change direction.

A verb that cannot change direction is OWE; another is LOCK. The reason for this is most likely that the action of OWE has virtually no movement. OWE is made by (repeated) contact of the point of the index finger (dez hand G) in the palm of the other (tab B) hand. Except for the repeated touching action, neither hand moves. One way of showing the difference between 'I owe you' and 'You owe me' is by reversing the orientation: For the former meaning, the tab hand's palm is obliquely toward the signer, but toward the addressee for the latter; and the touching action thus goes appropriately in the direction of the obligation.

MEET is a very interesting verb, in terms of its directionality and reversibility. The citation form of MEET uses both hands in index shape (G) with forefinger pointed upward; and its action is the coming together of the hands, palms toward each other so that the bent fingers of each make the contact. But this is not the only form in which MEET occurs. One way of changing it is for only one hand to move, the other remaining in place. This will mean 'One person meets another', in contrast to citation form, which means 'Two people meet.' With change in orientation, change in person is indicated; thus for 'I meet you' the passive (tab) hand is held out between the addressee and the signer in supination (i.e. twisted so that the palm is toward signer), and the active (dez) hand in pronation (full opposite twist) moves outward to contact the other. The meaning 'You meet me' reverses the orientation and also changes the direction of this verb. The passive hand—left hand for right-handed signers—is held close to the signer in pronation, and the active hand, supinated, moves in to make the same kind of contact (in all forms of MEET the bent fingers touch, though it is usual for the fingertip of an index hand to make the contact). These changes must be difficult to follow in description, especially for someone unfamiliar with ASL; but they become simpler if one thinks of each hand as a surrogate for a person involved in a meeting situation. The upward pointing index finger indicates the head, and the palm of each hand represents the frontal plane. So it is in mutual meetings that both parties converge, but otherwise one moves toward the other.

As we have seen, in MEET and OWE both hands change orientation for reversed relationship of arguments; but this is not necessarily the case for all reversible verbs. In some the tab hand stays the same and only the dez hand changes orientation. In BEAT, for example, the dez (what acts) is the dominant forearm. It strikes the tab (left forearm for right-handed signers) and bends at the wrist to continue its motion slightly. The tab is held horizontally and does not change orientation, but the dez, in a near vertical orientation is supinated when moving inward and pronated for outward ('I beat you') action; thus the point of contact on the tab is respectively ulnar and radial. In both forms the proximal (inside) surface of the dez makes the contact. Other verbs reversible in the manner of BEAT ('win in a contest' not 'strike') are ARREST, FLATTER, CALL, FREQUENT, BLAME, KICK, BITE, PREACH, COPY, and TEASE.

There are a number of signs with optional reversibility. The citation form of BORROW has for dez one (usually the dominant) hand on top of the other, both hands in 'K' or 'V' handshape; its action is motion of the whole dez configuration inward toward the signer. Signed thus, it is the form used in signing 'I borrow from you'. To sign 'You borrow from me' equivalent to 'I lend to you' one can either reverse only the direction of the motion or reverse both direction and the orientation of the hands. CALL-BY-NAME is another of the optionally reversible verbs. Verbs of this class are exceptions to a fairly general rule that seems to apply to reversible verbs; namely, directionality is often optional (though not for LOOK and SEE), but once this option is taken, if the verb is reversible, it must reverse as well.

Locationality. A third way a verb sign may show its grammatical relations is in displacement of the dez, as what acts, to the proximity of the location of one of its arguments. In contrast to directional verbs, in which the arms move during the formation of the sign, and to reversible verbs, in which the hands may change orientation, in the case of locational verbs, just before the sign is actually made the arms are first moved toward the appropriate location, and then the sign is performed. Because the extension of the arms and not their action determines the grammatical relations to be interpreted, those verbs that are prohibited by the nature of their action to be directional can still be locational. Thus OWE, as we have already seen, can reverse, but it cannot change direction, since it basically has no direction to change. Similarly the basic motion of WANT is the bending of the fingers; although in citation form the arms may move in toward the signer slightly, this part of the sign is not always present, especially in the unstressed form. Both of these signs, however, can be performed near the location of one of the arguments. In the case of OWE, the sign is performed near the location of the patient. In the case of WANT, the verb can be signed either near the subject (agent) location or near the object (patient) location. With other locational verbs, the subject or the object may be what is located by the verb (e.g. SIGN-ONE'S-NAME), and context or the signer's eye direction is needed to show which.

Combinations: phonological and semantic considerations. Directionality, reversibility, and locatability, three means of indicating pronominal grammatical relations, can occur in various combinations. Restrictions on which of these combinations occur are mainly determined by the phonology of ASL; otherwise lexically. It is also true that not all verbs are mutable in any of the individual or combined ways. These restrictions; too, are also largely phonologically determined.

A number of verbs can be both directional and reversible. These are largely two-handed (symmetrical) signs; e.g. HATE, BORROW, LOOK, and FEED. Their action is generally lateral rather than vertical, oscillatory, or circular. Verbs that combine directionality with location are a rather interesting set phonologically. In most of them, the tab is a hand held stationary. This tab can be placed toward the location of one of the arguments (thus making the verb locational); the dez hand then moves toward that argument from the direction of (or toward) another argument so that the action of the verb becomes the directional part. Examples include BLAME (optionally reversible as well), DIVE (source, not goal is locational), and KICK.

There are very few verbs that combine only reversals of orientation and location. They must be made out in space, and the motion must be minimal; e.g. LOCK, OWE (reversibility varies with idiolect), and PITY.

Numerous verbs can combine all three—direction, reversal, and location—generally with the same restrictions we find in the combination of location with direction; reversal is added. Such verbs include GET-EVEN-WITH, FLATTER, FOOL, FREQUENT, HIT, PAINT, and sometimes MEET (when one argument meets another only).

Exceptions. Not all verbs in ASL can undergo all these processes either singly or in combination. While there are some true exceptions (i.e. verbs that should change direction of movement, hand orientation, or location to show arguments but do not), there are a number of general principles that account for most of the verbs that do not participate in these processes. The first principle is that signs made primarily with body tabs cannot change in these ways. This class accounts for almost all verbs that do not participate in these processes. The verbs HEAR, LISTEN, and EAVESDROP are all located on the ear or signed toward the ear. TELEPHONE is made at the side of the face. FEAR, ENJOY, LIKE, INTEREST(ING), LOVE, and SUPPRESS-ANGER all have chest as tab. THINK has forehead; LOOK-LIKE is made near the face; EAT is near the mouth; SWALLOW is made on the throat; MISS (a bus) is near the nose; REFUSE moves over the shoulder; and SURPRISE is made near the eyes. None of these verbs is physically capable of incorporating location, reversal, or direction change.

A second principle is that if the movement involved in the sign is vertical, the sign verb cannot change direction or reverse, although it may be locational; REMEMBER, DECIDE, DISAPPEAR, PRAISE, LECTURE, ANSWER, and SUBSCRIBE fall into this category.

As we saw with OWE, a verb that has little movement other than simple contact may be able to reverse or incorporate location, but it cannot be directional. (We have defined directional as change in the direction of movement.) There are few verbs in ASL with minimal movement; examples are IRON, DANCE, SIGN (language), MEAN (intend or signify), ASSOCIATE, TRAVEL, and DO.

There is a group of verbs (e.g. JOIN, PRAISE, SKATE, DEPART, ARRIVE, SWEAR) that cannot reverse, apparently because it would be awkward if not physically impossible to do so. Thus in the sign ARRIVE (made by hitting the back of the dez against the palm of the tab hand) it would be impossible to reverse the orientation of the hands unless the signer is double-jointed. Some of the others are not impossible to reverse; but the notion of what constitutes excessive awkwardness in signing is still to be clearly defined; BORROW reversed is found to be quite difficult to perform by some signers, especially beginners, which may be why it is optionally reversible.

There are some real exceptions, verbs that are not covered by these principles but do not reverse or change direction. The verb RUIN, made by a fist dez grazing the back of the tab wrist and hand pronated as it sweeps outward, cannot reverse. The verb TEASE can reverse, even though it is almost identical to RUIN except that the movement or action is less forceful and is repeated. The semantic difference between these two verbs cannot account for their difference with respect to reversibility; nor can intensity as a feature. Other verbs with intensity in their action do undergo reversibility;

e.g. HATE, FINGERSPELL-BIG-WORDS, and BLAME. There are also verbs that do not repeat movement and yet can reverse; e.g. PAY, CATCH, and LOCK. This is simply an idiosyncratic exception such as is found for almost any morphological rule in any language.

Verbs of ASL that refer to time seem also to be exceptions to directional and reversible processing; e.g. FORSEE, REMINISCE, POSTPONE. Verbs with future reference tend to have forward movement; those with past reference tend to have movement backward. The forward motion in FORSEE and the backward motion in REMINISCE supersede any change in direction of movement (Nancy Frishberg, personal communication). [An alternate explanation is suggested by the authors above, page 152; this is to consider FORSEE and REMINISCE two glosses for but one verb that changes both direction and orientation, depending on whether the (adverbial) argument is the future or the past. Ed. note]

The three processes by which ASL verbs incorporate pronominal arguments are elaborations, it seems, of inflection for person. They operate with verbs in ASL and only with verbs as is exemplified in one way of saying 'no' in this language.

The 'no' used to answer a yes-no question is a modified form of the word no fingerspelled; but instead of forming a "proper" 'n' (first two fingers bent down over the thumb) and 'o' (all four finger tips meet thumb tip), the signer of this NO first spreads apart the thumb and the first two fingers then closes them so that just the three tips contact. Used to answer a question, this sign does not vary except in intensity, even when it might seem to be appropriate; e.g. in relating a conversation between the signer and another. The signer had reported asking the other person a question and continued:

(41) ME ASK-HIM, BUT HE ANSWER "NO".

In this sentence, ASK incorporates location and reverses, but NO, even though addressed to signer, is unchanged from its citation form.

By contrast, there is a verb, not an interjection, which we have glossed as SAY-NO, that is formed exactly like NO except that the arm moves from direction of agent toward goal (indirect object) and the dez orientation changes so that the palm faces the same way the (imagined) no-sayer faces. The starting point of SAY-NO also is close to the location of the agent. Again, in describing a conversation, a signer might report:

(42) ME REQUEST-HIM FOR NEW BICYCLE, BUT HE SAY-NO ME.

Here SAY-NO is directional; the arm moves from agent toward indirect object. It is reversible; the dez in citation form is pronated (palm out), but here supinated (palm to signer). It is locational; the back of the dez may start far out in the direction of the third person agent and end almost in the signer's (recipient's) face. In this example, then, the closing action of the thumb and first two fingers suffices to form the interjection NO, but this sign word is otherwise invariant. The same closing action, when it is used as a verb, exhibits three of the defining properties of ASL verbs.

Even though there may be an analogous relation between directionality, locationality, and reversibility in Sign and inflection for person in spoken languages, there is obviously a difference between the two modalities in the mechanics of the processes. Spoken languages use space only insofar as air is necessary to transmit sound waves. A gesture language, on the contrary, is laid out in space, and uses it crucially. Indeed one can say that in its processes of change in direction, orientation, and location ASL takes full advantage of being produced in space.

Incorporation of size and shape. If the processes which have been discussed make crucial use of space, the incorporation of indications of size and shape of arguments in sign verbs can be said to mold space to fit the intended change in meaning. The verb OPEN incorporates the shape of the patient (i.e. direct object when transitive and subject when intransitive). OPEN is one verb in which incorporation of size and shape is obligatory; in many verbs it is optional, but is therefore a stylistic change that adds color. Thus OPEN in DOOR

OPEN differs from OPEN in WINDOW OPEN; and other changes occur if it is a sliding window that opens. The ASL noun sign WINDOW represents a double-hung sash window; the hands together move apart vertically and together again. The sign DOOR represents a hinged door; i.e. hand or hands twist open, close, open. It is interesting to note that the Japanese sign for 'door' moves the hands horizontally apart and together, for the canonical door in Japan does not have hinges but slides.

The signs for opening a large box and opening a small box are distinct, as are the signs for opening a jar by unscrewing a lid or by prying. This brings up an interesting point. Many of the signs that we gloss with multiple words could be glossed more economically; e.g. we could say UNSCREW instead of OPEN-JAR-BY-UNSCREWING, or SPOON-OUT instead of REMOVE-FROM-CONTAINER-WITH-SPOON. In English there are both specific verbs and more general paraphrases. We are using the periphrastic alternative here because the sign on which the variation is based is more perspicuous.

As can be seen from the previous example, the size and/or shape of the instrument can be incorporated in a sign verb. In REMOVE-FROM-CONTAINER-WITH-SPOON, the shape of the signing hand is a slightly bent 'U' (i.e. index and middle fingers extended, not spread). If the instrument is a large spoon or a scoop, all four fingers are cupped to reflect the larger size of the instrument. If the instrument is a fork, the hand has the V handshape (index and middle fingers extended and spread). If the instrument is chopsticks, the sign starts with a 'V' but then closes to U as the motion is performed.

One verb that incorporates changes in size and shape of agent (subject) is RUN. For human and other two-legged creatures one of several variants of this sign uses the forefinger of each hand extended downward. If the runner has four legs, the first two fingers of each hand are used. This can be said to be an abstraction from an iconic representation of legs.

The size and shape of the source and goal can also be incorporated. In the example above, REMOVE-FROM-CONTAINER-WITH-SPOON, the size of the container is indicated by the circumference of the curved tab hand, and the shape of the container by its orientation to represent a vertical cylinder. If the source is not a container but a surface, the tab hand is held flat and contact is made on its palm.

Many of the features used to indicate size and shape of various arguments in the sentence are used and recombined over and over again. The extended forefingers used for iconic "legs" in RUN are also used for STAGGER, ENTER-VEHICLE, MOUNT (horse or bicycle), LIE-DOWN, STAND, FALL-DOWN (for quadrupeds the four iconic legs), and CLIMB.

The use of the tab hand for the container, source, or goal, with variation in its shape and orientation as required, is also quite extensive. If a flat hand is used, it can represent a plate, the floor, or any flat surface. If a slightly cupped hand, palm up, is used, it may represent any kind of dish. The cupped hand representing a cylinder, as noted above, can vary diameter of the indicated circle to show size; it can also be used more generally in signs like DEPOSIT-MONEY-IN-THE-BANK, RIDE-IN (or GET-INTO)-A-VEHICLE, as well as for the other directionality of the dez; i.e.'withdraw', 'get out'. More metaphorically, the curved tab hand represents the goal in JOIN-AN-ORGANIZATION or QUIT-etc. The B-tab hand, rotated edge upward, in signs that depict straddling a horse or bicycle, is also used to represent anything that may be straddled, e.g. a chair back or a wall. These features of the sign verbs all abstract general properties from the physical objects they are meant to represent—after all, a horse does not look much like a hand; and two bent fingers may suggest a spoon, once one knows that this is what they are supposed to represent, but really show no striking similarity to a piece of metal with a handle and a bowl. Nevertheless, these are symbols that can combine with other symbols to form new signs. Such combinations as REMOVE-FROM-WIDE-MOUTH-JAR-WITH-SPOON could be said to be analogic with polysyllabic words in English; they are more complex than simple signs.

The verb MEET discussed above is actually a special case, incorporating size and shape, of a more general verb COLLIDE. The performance of the general verb shows first whether both subject and object are in motion or only the subject; second, it shows, with size and shape incorporation, the salient dimensions of the two arguments. If the subject or object has height as its salient characteristic, the upright index hand is used ($G_{\wedge}$); e.g. for persons, poles, trees. MEET, which is restricted to human subjects and objects, uses two G-upward hands; but CAR-CRASH-INTO-TALL-THIN-OBJECT uses the index hand only as its (stationary) tab. An object considered to have height and width will generally be represented by a flat hand; thus, CAR-CRASH-INTO-WALL uses an upright flat hand as tab. When the subject or object has three relevant dimensions, e.g. a vehicle, a fist is used to represent it. Thus, TWO-CARS-COLLIDE consists of two fists converging and meeting in sharp contact. In the two examples just above, the dez (active) hand, which of course represents the subject, is a fist also. These one, two, and three-dimensional representing shapes of the hand are used as productive features in many signs. In general, those verbs that require exclusively human subjects do not vary for size and shape, presumably since the subjects' size and shape are already fixed. In actual appearance, however, the handshapes used are not even remotely suggestive of human beings.

Incorporation of manner. The speed, intensity, and extent of action of a sign can be varied to produce variations in meaning of the sign. This general property is not restricted to verbs; e.g. the sign LARGE is made with two hands starting side by side and moving apart. If the sign is performed relatively slowly and tensely and the hands move very far apart, the sign translates something more like 'huge'. If it is performed even more slowly and intensely and the hands in separating curve upward from the horizontal, it means something more like 'enormous'.

When a verb sign changes the speed, intensity, or size of its execution, the variation in meaning is most often in the manner in which the action is performed. If the verb is active, the change indicates an increase or decrease in intensity in what the verb refers to. If the verb is stative, change in action signals the signer's feelings. Changes of this general kind are also used to signal the imperative. Sometimes, depending on the lexical content of the verb, other changes in meaning will be found. For example if the verb TAKE-PICTURES is performed relatively fast, it means that a flash attachment was (or is) used to take the picture. If it is performed relatively slowly, the camera is on "bulb". If the verb THROW is performed relatively slowly, it means that the object thrown is relatively heavy, e.g. a shotputter's weight. If it is performed relatively fast, it follows the regular rule of being interpreted as throwing fast. If the verb OPERATE (surgery) is performed quickly, it means 'appendectomy'; if it is performed slowly, with elongated movement, it means 'caesarian section'.

Incorporation of manner into the formation of signs seems to play somewhat the same role in Sign that intonation plays in English, except that in ASL it may be more crucial, since often there will be only one sign where in English there may be several words for the same thing; i.e. words differing only in degree. In our first example, English has besides the word large, words like big, huge, enormous, and gargantuan. ASL has one sign, which, with variation in execution, can cover the same semantic range. (This is assuming that the variation in size occurs in an object of the same kind; ASL signs for largeness in height and in breadth or length differ.) Similarly, in English we have words like work, slave (verb), speed-up, and goldbrick. In ASL the one sign WORK is performed in different ways to reflect these different meanings. The sign MEET, if performed quickly and intensely so that the hands rebound to come apart slightly, means 'run into by accident' or 'bump into' (i.e.'chance to meet'). Performed more slowly, it means something like 'approach'. For more examples of incorporation of manner, see Bellugi & Fischer (1972).

Incorporation of number. Verbs in ASL not only inflect for subject, direct object, indirect object, goal, and location, but also for number. There are several kinds of pluralization; these can be termed Definite (individual), Indefinite, Collective, and Dual. Of these only the last is not productive and fairly regular in application. The definite plural can apply to every verb, without exception. Its closest analogue in English is in conjunction. This definite plural would be used to express in ASL such a sentence as

(43) a John left and Mary left and Bill left.
b John, Mary, and Bill left [but not together].

Actually, a closer analogue would be (44), which is ungrammatical in English unless one is actually pointing at persons while the sentence is uttered:

(44) He_1 left and she left and he_2 left.

The definite or individual plural is performed in such a way that the signer's body faces the location, real or established, of the subject (or object) while the sign is performed; it then shifts to face the next subject or object while the sign is, after a pause, performed again, and so on. If the verb is one that can reverse, change direction, or show location, these changes are made as well. It is important to note that all verbs perform this body shift (which can sometimes be limited to the head or even the eyes only) independently of any other mutability factors. Further, as in sentences (43) and (44), what is thus made plural is always definite.

The indefinite plural could be translated into English as 'many , but not necessarily all'; but a collective interpretation is not precluded. It consists of fast repetition, without pause, of the verb sign, at the same time that the body, hands, or pointing hand is moving around in a horizontal semicircle (Phonological considerations of what moves are presented in Fischer, 1973). This process of pluralization applies to virtually all ASL verbs, leaving few, apparently idiosyncratic, exceptions. As in the case of the definite plural, if the verb can reverse, change direction, or show location also, it does so. In the case of verbs that can reverse or change direction, in fact, it is the mutability for person that distinguishes pluralized subject, e.g., from pluralized object. (This is also true for the definite plural.). The verb HATE is formed by flicking the middle finger off the thumb, other fingers extended, in the direction of the object; and it requires a change in hand orientation if the object is the first person. In I HATE MANY, the flicking motion is directed outward from the body and is repeated an indefinite number of times as the hands and arms (HATE is a two-hand symmetrical sign) move in the horizontal curve. In MANY HATE ME, the sign is repeated, the hands and arms move in the same arc by turning the trunk, but the hands are directed inward.

A few signs optionally form the indefinite plural with a kind of manual sandhi; i.e. the many repetitions merge into one sign that is formed differently from the non-plural sign. There is a sign TAKE-A-PICTURE, made by sliding the B hand along the palm of the other hand and closing it to O as it slides. If this sign is repeated quickly as the hands move around the horizontal arc, it becomes difficult though not impossible to make a complete closure of the active hand for each repetition. In fact, the sign TAKE-MOVIES obviates this problem—instead of complete closure the fingers of the signing hand perform a sort of wave,in effect merging all the openings and closings; and now the hand no longer moves along the palm but remains stationary in respect to it (though the whole sign can still sweep around in a semicircle). There a few other signs that merge in repetition in this way, but it is by no means a general process.

The collective plural combines elements from the definite and the indefinite to form a new modification. It combines the horizontal sweep from the indefinite plural with the basically one utterance nature of the definite. The verb sign is performed once while the hands, body, and/or eyes are executing the horizontal sweep. This is true even for signs whose normal utterance requires repetition; e.g. READ, ENJOY. As with the other plurals, if the verb being modified in this way is reversible or can change direction, it does so as well. The interpretation of this kind of plural is that the argument of the plural verb (its subject or object) is 'everybody or everything without exception'. All verbs which can form the collective plural can also form the indefinite plural, but some verbs that can form the indefinite cannot form the collective; e.g. TEASE. (This verb is formed like RUIN except that the action repeats; since repetition or non-repetition are neutralized to non-repetition in making collective plurals, TEASE cannot have this plural, because any viewer would understand the sign to mean 'ruin'.) This is an apparently unallowable ambiguity, which ASL excludes. While an explanation of avoidance of ambiguity can account for this exception, it does not account for others such as INSULT, JOIN-TOGETHER, POSTPONE, or SPELL.

There are some exceptional ways in which verbs can form plurals, both indefinite and collective, besides using horizontal movement and/or repetition. One is to use two hands for plural if the sign is normally made with one hand. The difference between TELL and ANNOUNCE, 'tell everybody', is that the former uses one hand and the latter two. This mechanism is often used in conjunction with the others we have discussed, in particular the indefinite plural; e.g. the sign PICK-UP is made with one hand (Citation form: in front of body, Ø-tab, the spread hand pronated, 5_p-dez, closes to F as it moves upward). The sign PICK-UP-MANY-THINGS is made by using both hands in alternation to perform the same action; at the same time, the forearms sweep in an arc.

Another exceptional kind of plural is performed by using more fingers than are involved in the citation form. The verb LOOK-AT-ME is made by a V-dez pronated so that the fingers point at the signer. The sign EVERYBODY-LOOKS-AT-ME is made with with both hands instead of one, but also with four fingers instead of two extended from each hand; if only two fingers are used, the meaning is 'two look at me' —dual forms are discussed below. The sign CLIMB also shows this change from V-dez to 4-dez for plural agents.

The dual is formed in a limited set of verbs one of two ways. First, if one finger is extended in citation form, two fingers indicate dual; e.g. in PERSON-APPROACH, and MEET. One can thus make a sign meaning 'two people meet one person' (G-tab, V-dez; but dual in both subject and object and mutual meeting is not signed with touching V-dez hands, because that sign means 'copulate'). Second, dual may be made by use of two hands if citation form uses only one; the meaning 'two look at me' mentioned above differs from 'one looks at me' by just this one-hand, two-hand difference.

Habitual aspect. The habitual aspect of ASL verbs is formed by repeating the sign quickly but without the horizontal sweep used in the indefinite plural. This addition to performance of the citation form adds the meaning 'all of the time'. In general, only those verbs that are point-action, or can be interpreted as such, can form the habitual in this way. For example, READ, generally considered a durative verb, can take the habitual, for it can be idealized as a point-action or completive verb (Thus, He reads a lot but he hasn't read Roots, uses the verb first as durative then as completive). Verbs like FEAR, MEAN, and MISS (a person) cannot be construed as point-action and so do not have a habitual interpretation. Some verbs can repeat in this way but have a changed interpretation if used to mean durative; e.g. SUFFER repeated quickly without horizontal movement means 'suffer intensely' rather than 'suffer all the time'.

The one point-action verb we have found that cannot form the habitual by repetition is RUIN; its repeated form means TEASE. This is the one sort of phonological exception we have found. All the others seem to be either syntactic or semantic, as shown by the fact that just those verbs that can show habitual aspect by repetition can be embedded under the verb TEND.

Continuous aspect. A slow, drawn-out repetition is used with verbs to add the meaning 'for a long time'. Any non-stative, i.e. active, verb can be thus repeated. Thus, *FEAR-FOR-A-LONG-TIME is unallowable, since FEAR is a stative verb; similarly with KNOW. This is not to say that one cannot get the idea expressed of knowing or fearing something for a long time, but only that one cannot use this particular process to indicate that meaning in the verb.

Because the process uses drawn-out repetition, if the sign is normally made with point contact, the point becomes elongated as it were, so that the action of the dez becomes a brushing rather than a tap, jab, or touch. In addition, this continuous repetition always shows a circular motion superimposed on the action of the sign; e.g. TELEPHONE. Citation form of this ASL verb uses the cheek as tab and the Y-hand in supination as dez (i.e. the thumb is up and little finger down); the meaning 'make phone calls for a long time' or 'talk on the telephone for a long time' is signed with a circular rather than a straight motion to the cheek, and the hand moves along the point of contact in each repetition instead of simply touching it.

The interpretation of this kind of circled repetition is continuous action for some verbs; for point-action verbs it is interpreted as iteration. TELEPHONE is an interesting example, since it can be interpreted either as a point-action verb or as a durative verb. POSTPONE-FOR-A-LONG-TIME means, roughly, 'postpone over and over again', but PRACTICE-FOR-A-LONG-TIME means 'continue practicing for a long time', i.e. one practice session lasts a long while.

Reciprocal sign verbs. There is a sign EACH-OTHER that can be used in sentences with any verb for which it is appropriate. Examples of this type of reciprocal verb phrase are

(45) BOY GIRL PRAISE EACH-OTHER.
'The boy and the girl praised each other.'

(46) WE ENJOY EACH-OTHER.
'We enjoy each other.'

(47) TWO SISTER MISS EACH-OTHER.
'The two sisters miss each other.'

A second reciprocal involves actually performing the verb twice, especially if it can reverse or can change direction. If the verb is active, this reciprocal performance carries the implication of sequential instead of simultaneous action; e.g.

(48) I-FEED-YOU, YOU-FEED-ME.
'I feed you and you feed me' or
'We feed each other.'

(49) I-FREQUENT-YOU, YOU-FREQUENT-ME.
'I visit you a lot, etc.' or
'We visit each other a lot.'

The vast majority of ASL verbs must form reciprocal meaning in one of the two ways described. There is, however, a third way, albeit restricted, in which signs form reciprocals with a change in sign formation; it is perhaps an analogue of infixing rather than prefixing, suffixing, or periphrasis. This is the change that is most interesting from the point of view of mutability of verbs.

In English there are numerous verbs or adjectives that require a reciprocal interpretation, what is sometimes called an "NP* subject" (Lakoff & Peters 1969); e.g. to be *similar*, to *date*, to *conflict*. There are also many verbs in English that allow such a construction but do not require it and other verbs that can take the addition of *each other*; e.g. *like*, *call*. In ASL, as in English, there are verbs that allow the reciprocal and others that require it, but the distribution of verbs that require and that allow it may be different in ASL and English; e.g. ARGUE requires a reciprocal interpretation—if one wishes to say 'I could argue with that' (reciprocal, *That could argue with me), one must use another verb. Other such ASL verbs are AGREE, CLASH (personalities, not colors), CORRESPOND (send each other letters), DISAGREE, EXCHANGE, GET-TOGETHER, MINGLE, and CONVERSE.

The ASL verbs that permit but do not require reciprocity are more interesting because they do vary. It looks as though those verbs that fall into this category are a proper subset of verbs that can change location, orientation, or direction to incorporate nominal arguments. The verb GIVE is made by X-dez (forefinger extended and crooked) moving in the direction of the recipient as the wrist slightly but sharply twists; it can be made reciprocal by adding another X-dex hand moving in the opposite direction. HATE, SHOOT, LOOK, SAY-NO, TRANSFER, and FINGERSPELL-BIG-WORDS are similarly made reciprocal.

An exception is HELP-EACH-OTHER. HELP is formed by the upward movement or pressure of the flat hand, palm up (B -dez) under the fist (A-tab). HELP-EACH-OTHER is almost like the sequential reciprocals (I-HELP-YOU, YOU-HELP-ME), but instead of there being two performances of the sign action, there is only one—the hands in contact move back and forth between the locations of the two arguments.

One can speculate as to why some verbs permit the formation of combined reciprocals (i.e. one sign moved) and others do not. One reason seems to be that the verb must be mutable in at least one of the ways so far described. Another, more phonological as it were, is that in general the sign to be made reciprocal must be made with either one hand alone or the two hands symmetrically in action without touching. Of course also the reciprocal must be semantically and syntactically appropriate to the verb.

Reflexives. As in the case of reciprocals, there are both internal and periphrastic ways of expressing the reflexive in ASL. The periphrastic uses the -SELF morpheme moved in the direction of the reflexive argument (actually touching the chest for 'myself'). This is, however, not generally used in ASL for grammatical reflexives but for emphatic reflexives; e.g.

(50) YOURSELF CAN OPEN-IT.
'You can open it yourself!'

When the -SELF morpheme is used as a grammatical reflexive, the signer is said to be "signing English" rather than using American Sign Language.

For most verb signs, at least for those that incorporate location and/or reversal, the reflexive form is identical to the first-person-object incorporating form; thus

(51) ME HATE-ME.
'I hate myself' (verb projects toward signer).

(52) THAT-ONE HATE-ME.
'Someone hates me' (verb as above).

The difference is in the subject, not in the verb; most ASL verbs form the reflexive in this way.

For a small set of verb signs, there is a distinct variation from the base form to indicate the reflexive. This variation will often look like the "someone _____ me" form of the verb. Thus for this set of verbs too, it is true that they form a subset of verbs that can incorporate location and reversal. Nevertheless this variation will differ in some respects. Generally the reflexive form will be performed somewhat closer to the body than the first-person-object form, but there may be some interesting differences besides this one; e.g. CHOOSE is begun by an open spread hand, 5-dez, palm toward object, drawing away from the object location, and finished by the change of the configuration of the hand to 'F' (thumb, index fingertips touch, other fingers extended). To express the reflexive, 'I choose myself', the 5-hand begins so close to the signer's body that the fingertips touch the chest in closing and drawing away. [Note that this is the sign glossed VOLUNTEER in the dictionary. B.G.] Another example of reflexive form change is LOCK. In citation form the end of the X-dez twists in the palm of the B-tab hand. Like OWE, this verb is locational but not reversible in direction; it is made closer to the signer's body if the object is first person. LOCK, like OWE, also does reverse hand orientation to show grammatical relations: For 'I lock you (out or in)', the dez points outward toward the addressee, and the tab palm is toward signer; for 'You (or someone) locks me', the dez wrist is sharply bent and supinated to point inward, and the tab palm is outward. Compare the latter with 'I lock myself (out or in)'. The basic sign is the same in action and in what acts (configuration and orientation), but for the reflexive meaning, the whole sign is so close to the body that sometimes the arm of the dez hand will be touching the signer's trunk.

Although there are relatively few verb signs that form reflexives by changing away from both the citation form and the incorporating or reversed form, those that do so show once again the interesting mutability of ASL verbs.

Conclusion. In this paper we have investigated the role of verbs in American Sign Language. Because the verb forms the nucleus of the sentence, it can be said to form the nucleus of the language as well. We have looked into the properties of various verbs of ASL, particularly as they are different in distribution and process from English verbs with similar meanings, and we have examined how verbs in ASL change to reflect different semantic or grammatical relations. Although there may be a few verbs that are absolutely invariant under any of the conditions described, the vast majority participate in several of the mutations we have discussed. These kinds of mutations are very different from the kinds of grammatical deformations that occur in English; indeed they are different from those that occur in spoken languages as a whole.

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PART TWO

LEARNING AND USING SIGN LANGUAGE

This section of SIGN & CULTURE looks at a crucial part of the whole age span in the community using American Sign Language. This age range, infancy and early school years, is of course the most important period in language development. In Chapter 7 the ideal situation for a deaf child's language learning is described by an ideal teacher and model, a deaf woman with both a family background of natural sign language and an excellent linguistic education. Just as the immediate family is source and focus of any language community, so the chapter by the late Judy Williams gets at the heart of the sociolinguistic fact known as bilingualism.

Chapter 8 by Marina McIntire traces the stages passed through by a deaf child of deaf parents as she learns how to form what acts in manual signs. Like the hearing child whose output seems to contain first intonationally correct copies of adult utterances and then sensible strings of words, so the child described in Chapter 8 signs understandably before she can produce all the adult handshape forms of ASL.

In Chapter 9, Raymond Stevens considers a simple but basic mixup in patterns. Children learn in one manner; adults in another; yet our way of teaching deaf children has been modeled on the adult learning pattern.

Marvin Sallop describes in Chapter 10 a practical problem many teachers face: how to move the deaf children from ad hoc physical action to rule-governed signing to English-ordered sign use.

Summing up this part of the text, Bonvillian, Nelson, and Charrow survey a wide range of language problems confronted by deaf and hearing children and show how use of signs may bring a desirable resolution of many of them.

PART TWO: 7

BILINGUAL EXPERIENCES OF A DEAF CHILD

Judith Stein Williams

My husband and I had long expected that our children would have impaired hearing. Our genetic makeup showed this. Our parents, my uncle, and his four sons are deaf on my side, and four uncles on his side, and so are we. I was born deaf. My husband lost his hearing at the age of six months during an attack of whooping cough, which could be a sign that he was easily susceptible to deafness. When our son Todd was born, he showed so much alertness with his eyes and was so unresponsive to normal sounds that we knew he was like us.

My main concern was not his inability to hear (he is nearly five now and I still don't even give it a thought), but was instead how well he could live within the hearing world. His language acquisition was far more important, since this could open many channels for him including speech, lipreading, manual communication, and writing. The most important part was being able at an early age to express himself linguistically in the simplest forms. Lack of this ability can lead to personality and psychological problems. So I started talking to him like all mothers do, cooing, babbling, singing nursery rhymes, and the like—but I added signs and fingerspelling while doing all this.

It was not until he was nine months old that he finally expressed himself clearly in sign language. He loved to throw his spoon on the floor from his highchair and yell for me to pick it up. I always asked him, signing and speaking: "Where is the spoon?" at the same time pointing to it before picking it up. This time he threw it again but asked me in signs, WHERE SPOON? and pointed at it. This led soon to his substituting in this frame other signs (words) like ball, light, cat, dog, an book; and we went on to using the "Pictionary" and "First Objects" and other books I read to him from while he looked at the objects pictured. By the time he was one year old he was able to identify about fifteen different things in short sentences. His vocabulary increased but it was not until after he was toilet trained (at about twenty month that I introduced him to fingerspelling and put a lot of stress on this way of presenting words. He mastered this kind of communication of sentences on his level in a few months, and he associated the manua alphabet with the printed alphabet. At twenty-five months he started reading, and when he was turning three, he had five hundred words in his reading vocabulary and loved to read pre-primers and beginnin to-read books. His language developed in the simultaneous sense, that is, through lipreading my speech, fingerspelling, printed matter and signs. I see no conflict in his bilingual acquisition of English an Sign but believe that it greatly aided him. He loved nursery rhymes a was able to recite them himself. He eventually used his speech and sang some syllables out loud.

I enrolled him in the Gallaudet preschool when he was thirty months old, and its program gave him a lot of auditory training and speech work which I was not able to give him at home. His hearing a did wonders (although he has an 85 decibel loss in both ears across the whole frequency range), and he responded more to speech and showed willingness to learn to say words accurately.

From this point everything else seemed to come naturally, and his curiosity brought him even further, until I would say that he is progressing just as normally hearing children do except that he is les vocal. He learned English very readily in expressive exercises, routines, monologues, and interpretations as well as in social response and requests for information as the situation required. Simplification of grammatical structures was necessary in the early stages, but no at four years and ten months he simplifies them himself for his sister Tiffany, two years younger, and elaborates them for his Daddy.

His bilingual experience is in some ways like and in others unlike that of the American-Japanese bilinguals studied by Susan Ervin-Tripp (1964). Todd has a more general knowledge of Sign, because that is the language more often used at home, and a specific knowledge of English from his education at home and in school. His is really a merger of the two languages, therefore, as in the case of the Japanese women who tend to use Japanese for social intercourse and as their base language when with other bilinguals but who do use English as the situation and the persons talked to require. Todd relies more on his Signs than on his English with his family and more on spoken English in the classroom.

As Ervin-Tripp says, "...bilinguals who speak only with other bilinguals may be on the road to merger of the two languages, unless there are strong pressures to insulate by topic or setting." Her hypothesis is that "as language shifts, content will shift." And she presents examples of the Japanese women's monologues in which moon, moon-viewing, zebra-grass, full moon, and cloud are in Japanese, and skyrocket and cloud are in English. This kind of difference needs more study in the case of Sign-English bilinguals. There may even be a trilingual situation--some words in signs, some spoken, and some in English spelled in the manual alphabet, depending on the who, where, and what of the communication.

Another observation Ervin-Tripp makes is that the Japanese women "were in an abnormal situation" when one was asked to speak English with another Japanese woman. The effects on the style of English were clear when the two situations were compared. With the Japanese listener there was much more disruption of English syntax, more intrusion of Japanese words, and briefer speech.

This is also true in cases where two deaf children are forced to speak English to each other. I notice that Todd shortens his statements and tries to add signs between them. He uses more complex ideas, structures, and words in Sign than in spoken English.

In school Todd's English is more or less that of a four-year old in a pre-school situation. But at home, when he was three years old, he asked me at the table (in signs), "Where does the meat go?" I asked him what he meant, and he replied: "Look, I swallow the meat, and where does it go?" I then explained to him in details he could understand, and he was pleased and satisfied with the answer. Another time, about six months later, he asked me where a sound he was listening to came from. I told him that I couldn't hear anything at all but that he and Tiffany and Daddy have a little hearing. He was very much hurt by this and offered me his hearing aid, hoping I would respond to sound. When he learned that it was of no help, he cried and was upset for a while. Later I told him he could help me by telling me to move the car over when he hears fire engines or ambulances passing by, because I must give them right of way. He now delights in telling me when he hears a siren, and he lets me know when he hears a sound and identifies it for me--the vacuum cleaner, someone knocking on the door, and the like. He doesn't have much hearing but uses hi residual hearing well and intelligently.

Are there any deaf children this age without sign language who can express themselves this well, ask such questions, and make su distinctions? There are none that I know of. Knowing signs also help Todd in learning English vocabulary. For example, Todd learned abou a Zebra in school but not the sign for it. When he came home, he tol me about the characteristics of this new animal so I could easily ide tify what he was trying to find out--both of us using his "base" language of signs.

For young deaf children the most important contribution of sign language is to the child's expression of his needs, questions, and responses. With it he can also develop other channels of language and expression. Without it he may have some receptive competence, if he happens to be a very good lipreader, but he will be terribly hampered in his formative preschool years. Moreover, the spoken language the teachers are trying to instill in him becomes warped because he can't really use it expressively to ask questions and to make and try out corrections after being told of his grammatical mistakes.

Sign language has advantages for the hearing children of deaf parents as well. Their bilingual experience of serving their parents by making phone calls and receiving spoken messages can be very valuable. As they use both languages they translate from one to the other. The need to interpret for deaf parents makes them listen to adult conversation with more than normal childish attention. In retur they get top grades in reading, spelling, grammar, and other subject in school, as I found when I made a personal survey of my parents' deaf friends who have hearing children, about forty children in all.

These observations agree with the results of Meadow's study (1968). She notes that many professionals warn parents against sign language in case children are motivated not to learn speechreading and speech. Her study proves these fears false and shows that deaf children that are exposed to sign language in early childhood have better reading, speechreading, and written language scores. She con cludes that "the deaf children of deaf parents [who use sign languag have a higher level of intellectual functioning, social functioning, maturity, independence, and communicative competence in written, spoken, expressive, and receptive language."

Sign language is not incompatible with English. In fact, with some care about its order and by spelling English function words, it can be made into a visual equivalent of English utterance. Unfortuna there is not a school in the United States that uses it as a medium of communication between teacher and pupil, except in the advanced department. That is too late.

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This brief paper by the late Judith S. Williams was written in 1968 when she was a graduate student at Gallaudet College. It was entered in the ERIC Document Reproduction Service by CAL/ERIC and put on microfiche (ED 030 092). It is reprinted here not only because of its combination of personal knowledge with scientific observation but also in the hope that it may encourage others to make careful studies of how deaf children acquire language and to keep as clear a grasp of differences between language and two transmission modes.

PART TWO: 8

THE ACQUISITION OF AMERICAN SIGN LANGUAGE HAND CONFIGURATION

Marina L. McIntire

Abstract. Examination of American Sign Language — produced by a deaf child acquiring the language from deaf parents, and videotaped at age 13, 15, 18, and 21 months — shows conformity to many of the phonological rules operative for all languages. Active-hand configurations, i.e. dez handshapes, are learned in stages. A first-stage dez is substituted regularly for a dez of a later stage before second stage competence is reached. Rules specific to ASL dez substitution are posited.

Introduction. This study[1] focuses on the acquisition of one portion of American Sign Language phonology: handshape or dez.[2] The data are taken from a series of videotaped play sessions in the home of "FF" and her parents. FF has a borderline hearing loss in the right ear and is severely to profoundly deaf in the left ear. Her loss is congenital; rubella, birth trauma, and postnatal illness have been ruled out. Both FF's parents and all her grandparents are also hearing impaired. At the time of the study FF had not used any amplification. FF's parents both hold advanced academic degrees, and her father teaches at a large West Coast university. A normally-hearing son was born into the family when FF was nineteen months old.

The acquisition of American Sign Language as a first language is a critical area for study within the larger field of child language acquisition. If as most major theoreticians have suggested, the capacity for language is part of our human genetic inheritance, then a deaf child learning American Sign Language (ASL) as a first language should display linguistic behavior similar to that found in children who are acquiring other languages. The modality difference between visual-kinesthetic and auditory-vocal systems should result in no significant strategy differences in the normal process of acquisition. Interesting differences related to modality may appear between a normal hearing child and a normal deaf child, but parallel manifestations of the universal capabilities for human language learning should be apparent in both situations.

Initially FF demonstrated a precocity in her language development. At the beginning of the study, when she was one year and one month (1:1) old, she had a vocabulary of more than 85 signs. In the fourth and last session, at 1:9, her vocabulary had reached and passed the 200 mark. It should be noted also that FF's syntactic development was remarkably early and rapid. Two-sign utterances (e.g. MOMMY SHOE; and MORE FOOD) began appearing in her tenth month. At one year and three months, she began marking certain question forms with a general interrogative marker, shown herein as Q-SIGN. (This sign is made with a side to side movement of the spread hands held up and palm-in in front of the body — Ø $5_{\wedge}\, 5_{\wedge}^{z}$ in the notation of Stokoe, 1960, 1965, and called "what-shrug" by Fant, 1977.)

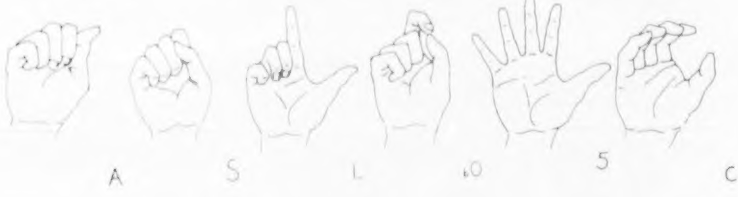
The corpus for this study represents a noticeably constrained output, especially in length of utterances and therefore also in syntactic complexity. Every effort was made to maintain a casual and relaxed atmosphere in the recording sessions; however, the presence of the videotape equipment and two outsiders (the investigator and a video technician) clearly had an inhibiting effect on FF's language behavior. Phonological (i.e. formational) output is less likely to be influenced by such constraints, and so the analysis presented here should not be significantly affected by these limitations of the data.

Hypothesis and model. Boyes-Braem (1973) developed a model for describing the process of acquiring handshapes in ASL; this was based on her analysis of one one-hour videotape of a deaf child of two years and seven months. Anatomical and cognitive constraints at first control the development of baby handshapes, according to Boyes-Braem; pointing and grasping are the functions most commonly served by the human hand (1973: 7). Sign language requires in addition the independent manipulation of the weaker ulnar group, i.e. the middle, ring, and pinky fingers. The conscious control of these fingers is acquired comparatively late in development (Kinsbourne & Warrington 1963). This suggests the likelihood of at least two steps in the order of sign language development: Handshapes with features applying only to the thumb and index finger, or to the whole hand, will be acquired earlier than those which require manipulation of the weaker fingers. Boyes-Braem's 1973 model suggests four stages[3] of development in acquiring the production of ASL dez handshapes:

1. A S L bO[4] 5 C G
2. B F O
3. I D Y P 3 V H W
4. 8 7 X R T

from Boyes-Braem
1973

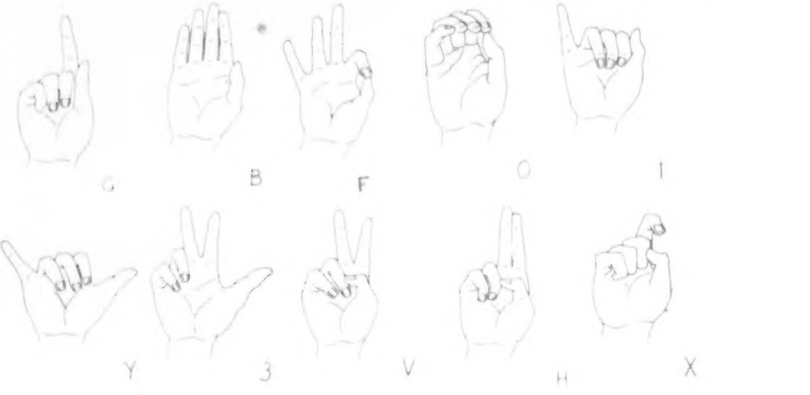
These sequences are based on the notion that 'A' (hand closed into fist with thumb aligned with wrist) is the unmarked form; this is supported by anatomists and observers of child behavior (e.g. Gesell & Halverson 1936). Dez handshapes



are defined by the positive specification of a series of features in this model: opposition of the thumb (S), extension away from the central axis of the hand of one or more fingers (G, 5), the adduction of the spread fingers toward the central axis (B), contact of the fingertips with the opposed thumb (F, O), contact of the thumb with the middle finger joint (P), insertion of the thumb between two fingers (T), and crossing of adjacent fingers (R). The predicted sequence of acquisition is based on these features.

This sequence suggested by the model is based on the gradually increasing ability, both physical and cognitive, of the child to control the weaker fingers, making possible the positive specification (production) of more and more "difficult" features. The prediction, therefore, is that signs requiring a dez handshape in a stage beyond the baby's performance abilities (for example, a handshape from line 3) will be signed by using as substitutes dez handshapes within her capabilities (i.e. from line 1); in this model it is also predicted that no dez from a later stage will substitute for a dez from an earlier stage.

Not all the baby's output, however, will be accounted for by this model alone. Several secondary factors influence a baby's performance. One is the baby's preference for (index) finger tip contact with a tab as signing surface. This has been



noted informally by linguists working with signing babies. It is demonstrated most emphatically by the commonly reported occurrence of MOTHER and FATHER being signed with a G dez instead of a 5 dez, although the latter is well within the limits of the babies' abilities.

Another secondary factor is miming. Often handshapes are influenced by an action associated with the referent. For instance, FF signs BELT with an S hand rather than the appropriate (to adult standards) H. Given the features of H, we might expect it to be replaced by a G handshape; however, FF mimes the action of pulling a belt around her waist by using an S hand.

A third possible influence on the output of babies'signs is the nature of the feedback: Signs made within the visual field (e.g. BALL, SHOE) offer potential visual feedback. In some sense this may make it "easier" for a baby to exercise self-correction. But if a sign is formed outside the baby's field of vision (e.g. BLACK, MOON), she has only kinesthetic or haptic (kinesthetic plus tactile) feedback. Thus, FF signs BLACK with a 5 dez, rather than with a G.

A fourth factor is the complexity of the sign action or sig required by the sign. We have no systematic, empirical evidence regarding the acquisition of sig, but it seems counterintuitive to believe that sig would behave very differently from dez in the process of acquisition. It seems likely, i.e., that a sign specified for a repetitive touching movement (like MOTHER and FATHER) will be an "easier" sign for a baby than one that is specified for interchanging action (HAMBURGER). This is a speculative area, since the acquisition of sig is largely unexamined. It should be noted that these factors interact in fairly complex ways and that a thorough examination of their relationships needs to be carried out.

Assimilation, the final secondary influence to be considered here, is by no means limited to babies. Dez handshapes from adjacent signs are either anticipated or perseverated, resulting in mis-formations. The phenomenon for language has been discussed extensively by Fromkin (1973) in her landmark work on speech errors in spoken language; Newkirk, Pedersen, and Bellugi (1976) discuss the same sort of errors in adult users of American Sign Language.

Substitution of dez handshapes in children acquiring ASL should therefore be explained by at least one of these factors:

1 The dez required is from a group with feature specifications as yet beyond the child's cognitive and physical abilities;

2 The sign is made with fingertip contact on the tab surface;

3 The sign is pantomimed;

4 The sign occurs outside the field of vision;

5 The movement of the sign is "complex";

6 The handshape is anticipated or perseverated from an adjacent sign in the string.

Data and discussion. The data discussed here are taken from four different play sessions videotaped in FF's home and described in outline in Table 1. Participants in each session were FF, her mother, and the investigator, with FF's father in sessions 1 and 3, and the investigator's two sons, aged 6 and 10, in session 2.

Session	Date	FF's Age	Duration
1	5-13-73	1:1	20 min.
2	8-04-73	1:3	40 min.
3	10-13-73	1:6	40 min.
4	1-08-74	1:9	30 min.

Table 1. Description of data sessions.

The videotapes were transcribed in a notation based on that in Stokoe et al. (1965), following Boyes-Braem's model. FF's dez handshapes were analyzed to determine the percentages of successful performance of target handshapes, and to examine substitutions (or unsuccessful tokens). The results of the analysis are summarized in Table 2.

Dez	Cor/Req #	Cor %	Sub #	(n, 186) % all Sub	Occ #	(n, 621) Occ %
A	4/11	36	16	9	21	3
S	15/34	44	11	6	26	4
L	0	0	2	1	2	-
bO	13/16	81	35	19	47	8
G	28/33	85	16	9	44	7
Index	177/188	94	-	-	177	29
5	189/194	97	101	54	291	47
C	2/9	22	1	0.5	3	-
B	5/59	9	3	2	8	1
F	0/7	0	0	0	0	0
O	0/20	0	0	0	0	0
Y	0/7	0	0	0	0	0
3	1/12	8	0	0	1	-
V	0/8	0	1	0.5	1	0
H	0/15	0	0	0	0	0
W	0/2	0	0	0	0	0
8	0/4	0	0	0	0	0
X	0/5	0	0	0	0	0

Table 2. Dez handshapes required and occurring as correct or as substitutions in the data.

In Table 2, the columns show respectively, the notation symbol for dez, the tokens correct versus tokens required, this ratio as percentage, the number of dez handshapes substituted for that required, the percentage of these in all substitutions, and in the last two columns, the number and percentages of total occurrences. Note that deictic signs or "indexing" (Index in the table) have been separated from the rest of the signs formed with the G dez — this pointing gesture can serve as a locative ('here', 'there'), or as a subject or object pronoun. Since this deictic behavior is common to hearing babies as well (see Bullowa in SLS 16, 193-218), it seems important to take note of its prevalence as a linguistic phenomenon in the present corpus.

One particular type of sign caused difficulties in the tabulation. Some two-handed signs are symmetrical in dez shape, dez orientation, and sig; i.e. are made in Ø tab (e.g. Q-SIGN, RAIN, CRY). Signs like these are commonly formed with only one hand, as Battison (1974) points out.[4] In tabulating these signs, there was no dependable way of judging whether the target was the one-handed or the two-handed sign. In no case did FF interpret this kind of sign as having different dez handshapes or different sigs. In order to maintain unity of analysis, all these signs have been classified as if one-handed, i.e. requiring and being signed with only one dez.

Substitution handshapes are shown in Table 3 below and across the page:

Session	Dez req.	Dez subs.	Sign(s)
	A (S)	bO	SHOE
	bO	5	BIRD
	F	5	CAT
1	O	bO	FLOWER, SAND
	Y	5	YELLOW
	3	5	DUCK
	X	A	APPLE
	A(S)	5	NUT
		bO	ORANGE
2	5	bO	CAKE
		G	Q-SIGN
	C	A(S)	MOON

Session	Dez req.	Dez subs.	Sign(s)
	B	5	ELEPHANT, BABY, CAKE (tab hand)
		bO/5 (A/A)	HAMBURGER
	F	5	CAT
	O	bO	FOOD/EAT, FLOWER, BALLOON, STRAWBERRY
2 (cont'd)	Y	bO	STRAWBERRY (as tab hand)
	3̲	5	BUG, HORSE, RABBIT
	V̈	bO	FROG
		G	GOAT
	H	A	EGG (simultaneous utterance)
	8	bO	WATERMELON
	X	A	APPLE
		B	CEREAL
	A(S)	bO	BICYCLE
		5	NUT
	bO	5	BIRD
	C	A(S)	MOON
	B	5/5	HAMBURGER
	F	5	HAIR
	Y	5	RHINOCEROUS (non-standard)
3	3	5	BUG
	V	G/G - 5	SCISSORS
	H	G/G -5	CHAIR/SIT
		G/5	SPOON
	W	5	WATER
	8	5	WATERMELON
	A(S)	bO/bO	HOT-DOG
	bO	A	PEN/WRITE
	5̈	C	LION
	C	5	TURTLE
		5 - L̈	CHURCH
4	G	5	-UP, BLACK
	B	A/5 - 5/5	HAMBURGER, BOAT
		5/5	BOY, BROWN, BEE, BREAD, PUPPET
		G	ELEPHANT
		S	BREAD (tab hand)
	F	5	BEE, CATS(UP)

Table 3. Substitutions (continued).

Session	Dez req.	Dez subs.	Sign(s)
	F	G	CATS(UP)
	O	A	HOME
4	Y	5	AIRPLANE, COW
(cont'd)	3	5	HORSE, BUG
	V	L, 5	SHEEP
	H	S	BELT

Table 3. Substitutions occurring in the corpus.

Several points appearing in Table 3 are noteworthy. The first and most significant is confirmation of Boyes-Braem's hypothesis. Stage 1 is appropriately named; virtually all of FF's output in this corpus is from stage 1. Certainly, most of her vocabulary is also within the signs requiring stage 1 handshapes, but note that only four out of 186 substitutions are not from stage 1.

Even though Boyes-Braem's basic hypothesis (the dez handshapes requiring control of thumb and index finger, or the whole hand, will develop before others) is sustained, certain patterns show in the data which are not consistent with the distinctive features Boyes-Braem proposes. Note in particular the interaction of A and S and the variation of these two handshapes with bO, baby O. Lane, Boyes-Braem, and Bellugi (1976) propose a different set of distinctive features for dez configuration in ASL (As it would be inappropriate to reproduce their entire system here, the reader is urged to consult their findings). In their system, thumb opposition is not a distinctive feature (hence A = S); rather the features that apply to a stage 1 dez are as follows:

[+ compact]: no fingers extended
[+concave]: at least two bent fingers
[+ index]: all fingers except the index closed
[+touch]: one or more fingertips contact thumb
[+broad]: three or more fingers extended
[+full]: all four fingers extended
[+radial]: (at least) the thumb extended
[+ulnar]: at least the pinky extended
[+ dual]: only two fingers extended

This changes the feature specifications for stage 1 dez handshapes considerably (Table 4). Note that certain feature assignments are redundant and not specified; e.g. [+contact] implies [- broad], [- full], [-ulnar], etc. Hence not all features are specified for all dez handshapes.

A (S)	bO	C
+ compact	+ compact	+ compact
- concave	- concave	+ concave
- index	+ index	(- index)
- touch	+ touch	- touch

5	L	G
- compact	- compact	- compact
+ broad	- broad	- broad
+ full	- ulnar	- ulnar
+ radial	- dual	- dual
	+ index	+ index
	+ radial	- radial

Table 4. Distinctive features for Stage 1 dez handshapes, after Lane, Boyes-Braem, & Bellugi (1976).

Note also in Table 4 that some feature values can be changed non-distinctively; thus, [+ concave] applies to the handshape used in certain signs and is indicated in Stokoe notation by a superscript of three dots over the dez symbol: $\dddot{5}$, WANT; $\dddot{L}$, BIG-HEAD; $\dddot{V}$, STRICT. The new set of features facilitates the analysis of data from the FF corpus.

For example, we can suggest three rules in FF's phonology for the first two sessions:

$$\text{R1.}\quad \begin{bmatrix} -\text{compact} \\ -\text{index} \end{bmatrix} \Rightarrow \begin{bmatrix} +\text{broad} \\ +\text{full} \\ +\text{radial} \end{bmatrix}$$

$$\text{R2.}\quad \begin{bmatrix} +\text{compact} \\ -\text{concave} \\ +\text{index} \\ -\text{touch} \end{bmatrix} \Rightarrow \begin{bmatrix} -\text{index} \end{bmatrix}$$

$$\text{R3.} \quad \begin{bmatrix} +\text{concave} \\ \langle +\text{touch} \rangle \end{bmatrix} \Rightarrow \begin{bmatrix} -\text{concave} \\ \langle +\text{index} \rangle \end{bmatrix}$$

Rule 1 states that non-compact handshapes that are [- index] become 5's; this includes signs requiring F, 3, and Y (e.g. CAT, BUG, YELLOW). Rule 2 accounts for X becoming A, as in APPLE. Rule 3 states that [+ concave] handshapes become [- concave], and that if such a dez is also specified as [+ touch] (O), it becomes [+ index] (bO), as in MOON, FLOWER.

These rules will not account for all the data. This is largely because the focus here is only on handshape, which with orientation of the dez makes up only one aspect of the three aspects of ASL phonology. In the phonology of a spoken language, features must be controlled simultaneously (e.g. voicing, tongue position, lip rounding, etc.) in order to produce sounds; and when sounds are combined to make utterances, whether words or sentences, they are produced sequentially. We have seen that for sign language handshapes features can be posited, and that they are manipulated more or less successfully in a baby's sign production. Note, however, that handshapes do not exist in any sort of state separate from the other aspects of a sign: action and location; nor separate from the orientation of the dez. That is to say, a dez, as a handshape plus orientation, must be produced in a certain location, with a certain action, if sign behavior is involved (see Stokoe 1960: 40f). Presumably, the other aspects, tab and sig, may also be organized by features, which must also be produced simultaneously. Linearity enters the signing process only at the syntactic level. This simultaneity places a special kind of demand on an infant whose cognitive and physical abilities are still developing. It is for this reason that the secondary influences previously discussed can override the systematicity of rules based on features alone.

A preference for fingertip contact is evident in several substitutions: SHOE, A/S ⇒ bO; BIRD, bO ⇒ 5; GOAT $\dddot{V}$ ⇒ G; and WATERMELON, 8 ⇒ bO (on the tab hand 5 instead of S'). Mime is evident in BELT, H ⇒ S, discussed above, and possibly in DRINK, which will be discussed below.

Of the substituted dez handshapes occurring outside the field of vision, virtually all are cases of stage 1 configurations replacing more complex handshapes, as suggested by the model (see Table 5).

Sign	Req.	Subs.	Ses.	Other factors
BIRD	bO	5	1,3	fingertip contact
CAT	F	5	1,2	fingertip contact
DUCK	3	5	1	fingertip contact
APPLE	X	A	1,2	
FLOWER	O	bO	1,2	fingertip contact, cplx. sig
NUT	A	5	2,3	
MOON	C	A(S)	2,3	
ELEPHANT	B	5,G	2,4	complex sig
FOOD/EAT	O	bO	2	
HORSE, RABBIT	3	5	2,4	complex sig
FROG	V̈	bO	2	cplx. sig, fingertip contact
GOAT	V̈	G	2	cplx. sig, fingertip contact
EGG*	H	A	2	complex sig, *
CEREAL	X	B	2	complex sig
HAIR	F	5	3	
WATER	W	5	3	
LION	5	C	4	
CAT- (CATSUP)	F	5 - G	4	
-UP	G	5	4	complex sign, interference
BLACK	G	5	4	fingertip contact
BOY	B	5	4	
BEE	B - F	5	4	complex sig
HOME	O	A	4	
BELT	H	A(S)	4	pantomime
COW	Y	5	4	

* The utterance is [FOOD signed simultaneously.
EGG]

Table 5. Substitutions of handshape occurring outside the field of signer's vision.

Other factors also interact with these data. One would want to say that substitutions not accounted for by some rule, or by some other factor, e.g NUT, ELEPHANT in the table, are in fact explained by the unavailability of the sign for visual feedback. While the evidence seems to indicate that this may have an effect, the interaction of factors is still too opaque to make a compelling case for singling out visual feedback. Further evidence from both child language acquisition and adult errors in signing will be of some value in deciding the relative importance of the feedback factor.

A "complex sig" is a speculative matter, as has been said; many sigs, however, appear in FF's production altered from the required or adult form, and they do seem to have an effect on the handshape. For example, B/B ⇒ A/A, HAMBURGER (see Table 3). Similarly, FROG, WATERMELON, GOAT, EGG, and CEREAL may be accounted for, at least in part, by the complexity of the required sigs.

Assimilation from an adjacent dez in the string is not, strictly speaking, a factor in the present corpus. At least three signs, however, serve to show that some interference from adjacent signs does indeed influence output.

In session 2, Q-SIGN is formed twice with a G, rather than a 5. FF is looking for a pen that had dropped to the floor and disappeared. She is trying to elicit the attention of the adults present to help her find it. An admittedly rich interpretation of the passage — delivered after she had jumped to her feet — would be: "Hey! Where's that pen? It's somewhere here on the floor." It is my contention that the handshape for INDEX ('here on the floor') has intruded on the movement of the Q-SIGN ('where's/what's something'), and that this particular utterance represents a blend of the two signs. This phenomenon is not uncommon in adult experimental and error data.

An assimilation of tab (non-active) hand to (active, signing) dez hand occurs in session 2. The target sign is STRAWBERRY, signed by twisting an O hand dez on the extended pinky finger of the other hand. The O dez is realized by FF as bO. Y is ordinarily realized as 5, but here presumably through assimilation, it becomes bO. Here also the sign changes type as well; instead of a passive tab hand held inactive while dez hand twists, FF has made it a double-dez sign with symmetrical sig:

Target: Y' O$^{\omega}$ STRAWBERRY Ø bO' bO$^{\omega\sim}$: FF

An actual error appears in session 4. A common sign for 'catsup' used in FF's family is performed as CAT + UP (F$^{>}$ ØG $^{\wedge}$). FF's attempt to produce this compound actually involves five successive signs:

Ø5$^{\wedge}$ ⁞)G^{x} ⁞)5^{x} ⁞ Ø5$^{\wedge}$ ⁞ ⊔G^{x} 'up-cats' (?)

It seems that the process may look something like this:

F ⇒ 5 via Rule 1 (above)
(CAT)

G ⇒ 5 (UP)	via perseveration
5 ⇒ G (CAT)	dissimilation: a need to distinguish two parts of a compound

Session 4 offers a unique opportunity to observe the entry of a positively-specified feature into FF's output. It also offers some supportive evidence for the psychological reality of the feature [+concave] in the Lane, Boyes-Braem, Bellugi feature system. The feature has not been realized until this point (session 4) in the corpus (see Rule 2, above; one exception, DRINK, is discussed below). Two signs in session 4, however, indicate that FF is beginning to distinguish [+concave] as a feature in her phonology. LION is signed with a bent spread hand: $\dddot{5}$ (Remember that concavity as a low-level feature is indicated by three dots over the dez symbol). FF signs LION with a C dez. As Boyes-Braem points out, adduction of the fingers is a natural, involuntary reflex in partially extended position (LION is signed with the hand above the top of the head). Added to this natural process is the fact that the sign is formed outside the visual field of the signer. The result is FF's over-application of the feature [+concave], perhaps mistaking a low-level feature for a distinctive one.

Additional evidence for the process by which the feature is acquired is exemplified in the sign CHURCH, which is within the visual field. FF signs:

$S' 5^{x}$ $S' \dddot{L}^{x}$ $S' C^{x}$ 'church'

I.e. she makes a sequence of three signs — attempts at a correct "pronunciation" as it were. In all three, the target forms of the tab (S hand pronated), sig (touching), and dez orientation (pronated so that radial or thumb side of dez makes the touch) are realized. Only the dez handshape changes. From the left, the substitution 5 gives way to bent $\dddot{L}$ (the feature [+concave] being applied to the thumb and index finger only); then $\dddot{L}$ gives way to the target form C, with the feature [+concave] appropriately applied.

DRINK appears in session 2 in the adult form, with C dez. Because this is an iconic sign, it may be that miming is a factor in assisting FF to form a C dez handshape before the feature [+concave] appears elsewhere. In any case, it seems to fit the definition of a "phonological idiom: a pronunciation which does not obey the constraints which otherwise operate on the child's output", as given by Moskowitz (1977: 3). Such idioms have been observed in children acquiring numerous different spoken languages; it is apparently a phenomenon that is not excluded from ASL because of the different modality sign language uses.

More evidence regarding the feature [+concave] comes from two occurrences of WANT. Neither token is absolutely correct; in each case FF seems to know that the feature of concavity must be added, but she does not yet have the competence to integrate it. In the first instance her 5 dez is marked for laxness ($\breve{5}$), and in the second it is marked for tenseness ($\bar{5}$):

Session 3 $\emptyset\ \breve{5}\ \breve{5}^{\top}$ 'want'

Session 4 $\emptyset\ \tilde{5}^{\perp}$ 'want'

Reilly (1977) has discussed a similar phenomenon with hearing children learning spoken English; she demonstrates that children use second turns in discourse to correct certain linguistic features that they are acquiring. While the case here is not a second turn, it seems that this application of various low-level features is evidence that FF is working on concavity during the two sessions in question.

The question inevitably arises as to how much phonetic variation is normal in any given adult sign, and how much of FF's output falls within that range. In making judgments for "required" dez handshapes, I have followed the Dictionary of American Sign Language (Stokoe, Casterline, & Croneberg 1965 [1976]) as much as possible. The exceptions have been mainly signs that I consider to require a baby O, bO, not a distinctive form in the dictionary system. Some phonetic variation is apparent in adult signs. A few of the substitution of the handshapes in the data are in fact within the acceptable range of variation. An example is FF's TRAIN in session 4:

$G_{\text{ɒ}}^{\dagger}V_{\text{ɒ}}^{\text{I}\cdot\cdot}$ 'train'

This can be and is signed in adult dialects either with both hands in H configuration or both hands in V configuration. We might predict that in FF's signing V would substitute for H, because abduction, i.e. separation, of the extended fingers is more natural than its opposite, adduction. In these cases there has been no clear way of judging what the target was. I have systematically followed the Dictionary and counted the V, and similar occurrences, as substitutions. In the same way, I have rated FF's use of 5 hand configuration as substitutions of handshape when these are realizations of B tabs in the target. In no case do FF's substitutions block the comprehensibility of her signs. In an adult such tokens would probably be stylistically marked as casual or even sloppy signing, but in most cases not 'wrong'. This is a matter that requires more investigation of both child and adult signing.

Conclusion. In summary, we should note that although phonology in American Sign Language is in some ways very different from phonology in spoken languages, it obeys many of the same laws. Battison (1974) has discussed conditions for deletion; Frishberg (1975, 1976) has demonstrated the regulating forces in historical phonological changes of signs; Newkirk, Pedersen, and Bellugi (1976) have begun an analysis of phonological errors in ASL, comparable to work done by Fromkin (1973); and Bellugi and Siple (1974) have produced experimental evidence for the psychological reality of dez, sig, and tab as the organizing principles of signs. In the present case, we can see that it may be possible eventually to write a set of rules, abstract in nature, which will provide a description for the acquisition of a phonology without sound.

Moskowitz (1970) and Smith (1973) have both presented analyses of how the phonology of English is acquired. The children in their studies appeared to have rules in their phonologies that simplified the adult, target system. Similarly, FF's phonology appears to simplify the structure of an adult ASL phonology. By appealing to the features proposed by Lane et al. (1976), we are able to see how a deaf child may make hypotheses about her language similar in nature to those that a hearing child makes.

In no sense is the present study to be considered conclusive, however; rather it should be taken as setting forth a possible set of guideposts for future research. Many questions have been put aside or barely touched upon. However, any future research must, I think, include the assumption that all languages appeal to the same internal acquisition device, regardless of apparent differences in modality and articulators.

NOTES

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2 Dez, sig. and tab are terms given in Stokoe (1960) for the three aspects of behavior into which sign morphemes were first analyzed. Subsequent work has not altered the logic of analyzing a sign into *what acts*, *what that does*, and *where action occurs*; but shortcomings in the original presentation and in the *Dictionary* (1965 [1976]) may be amended by taking dez, as what acts, to include both specification of handshape and specification of orientation, when that is distinctive. [Ed.]

3 The term "stage" indicates only the four sequential groups of the model. Nothing other than a sequential progression in dez acquisition is implied.

4 "Baby O", symbolized bO, is the handshape which appears just at the close of the adult sign TWENTY; it is not cheremic in Stokoe's notation (where it is treated as a closed variant of X, thumb opposed to index finger).

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PART TWO: 9

CHILDREN'S LANGUAGE SHOULD BE LEARNED, NOT TAUGHT

Raymond P. Stevens

Children who are born deaf do not learn to speak because they cannot hear. They do not hear other people speaking; consequently they cannot imitate the sounds we call speech. They cannot hear themselves vocalize; so they cannot monitor the sounds they make. To learn speech a person must be able to hear models to be imitated and to monitor the sounds made in attempting to imitate the models.

Deaf children can be taught to speak--provided that specialized instruction presents not auditory but kinaesthetic models and guides their attempts at imitation by use of the instructors' hearing and coaching as the indirect monitoring channel. But not all deaf children are taught to speak with proficiency and intelligibility. Only a very few, perhaps five to ten percent of them, acquire speech skills sufficient for communication in a near-normal, non-frustrating way. The great majority of deaf people, both children and adults, have non-functional speech. Yet, because nine out of ten deaf children have hearing parents, speech has become the focal point in the educational process of most deaf children.

Deaf children do not learn language--the English language in America--of a kind acceptable to others, because they cannot hear. They do not hear the language and consequently do not learn the patterns that make up sentences, phrases, and idioms.

Unfortunately, learning to speak and acquiring language have often been equated and confused; as a result the ability to produce speech sounds has become more important in the eyes of many teachers and parents than the possession of language.

The consequences of mutism or quasi-mutism caused by deafness are great and permanent for the adult. Teachers should do all they can to teach speech, to give the deaf child functional speech. The failure to try is a sin; the failure to succeed is not, however, as bad as most hearing people seem to think. Deaf people communicate in other ways than in speech.

The failure to learn English has far greater and more devastating consequences than the failure to learn speech. Our educational system depends on English much more than on speech. The world of trade and industry, social services, and technology depend on language which is expressed in a variety of forms. The deaf child who cannot speak can often write or fingerspell or sign, but the child who does not know the English language has no way to communicate with precision. Speech is only one form of communication; English is the only language of our culture. The child who cannot speak is cut off from only those people who will not take the time to use another form of expressing English. But the child who has not learned English and has not acquired an education in its use has nothing to say and no one to listen to him. Unfortunately, the parrot-like speech of the illiterate deaf child is more a reassurance for the parents than a practical way for the child to communicate.

There are many successful deaf adults who do not have speech. There are also deaf adults who can speak but have nothing to say, who have gone to school but who can't think.

Education for the deaf has the talents and the energy to succeed. Ironically, schools and classes for deaf children could be relatively more successful than schools for hearing children, simply because deaf children are much more dependent on the educational process than are hearing children. Almost everything that is taught in school is new to the deaf children. Unfortunately, however, the system has not done well. There are many controversies and antagonisms within the field. There is little agreement on major goals and objectives.

Generally, the question, What is the most important thing in deaf education? gets three answers. One group of educators will say: "Speech and oral communication skills." A second group may say: "Language or education." A third group, deaf people themselves, often say: "Communication."

"Communication" in this answer is not to be equated with English or spelling or lipreading or even with sign language and fingerspelling. I believe that deaf people mean communication not of language but through language the attitudes, knowledge, thoughts, desires, expectations, and mores that make individuals part of their culture. I will agree with anybody who says that deaf people get along better if they have intelligible speech, good spoken language, or a Ph.D. in literature. But the youngsters and adults who don't have intelligible speech, the King's English, or educational shingles are set apart, I believe, not because of language and speech but because of culture. Not culture in the sense of the fine arts, sophistication, and style, but culture in the sense of socialization and behavior patterns and social characteristics common to a particular group of people. The most important tool or vehicle in the socialization process of people is language. Language is a means of socializing individuals into their culture. Parents talk to their hearing children, not in order to teach them a language, but rather to satisfy their needs and wants and to teach them right and wrong as regarded by their society. The children talking with their parents are learning the language of their culture; they are not being taught it. They are learning language as a tool. It is functional. It is a means to an end. That end is satisfaction of needs and wants, the acquisition of acceptable behavior, and the recognition of themselves as individuals.

Deaf children, on the contrary, are taught language. True, their teachers want them to read, but teaching language has become the end, not the means, of the educational system. The teachers' communication with the deaf child is too often about language instead of about his environment, his culture, his very life. School for the deaf has become a place to be forced to learn a strange and foreign language and speech rather than a place to learn about culture, and in doing so to learn language.

The consequences to the child of not being a part of the larger culture are a low reading level, a different sense of humor, and a different language. Deaf students who do not read, cannot --because they are not socialized into their culture. English in its printed and spoken forms is the language of the culture. Until deaf children learn English in the same manner that hearing children learn English, the majority of them will not succeed in school, will not read, and will not hold jobs commensurate with their innate abilities. Deaf education must communicate the culture, the attitudes, the humor, the folkways, the family traditions to deaf children. English language must become the product of that communication.

Deaf children must learn culture and language simultaneously. All that my grandmother, or that sociologists and teachers of the deaf, would call "culture" and say was important for each person to know is on the other side of the soundless barrier for each deaf child . Properly directed, education for the deaf could be devoted to breaking that soundless barrier.

All native or mother-tongue languages are learned. For too long the education of the deaf has concentrated on teaching the language. This is contrary to the natural process of language learning. Simply stated, language must be learned and not taught. Language and culture are acquired by the growing child and cannot and should not be forced into him.

Language in this sense of the word is the system of communication, whether English, French, or so-called Deaf English, that is learned through experience and use, learned out of necessity--nothing like the system that is presented in the classroom. Language is an organic, dynamic, unexplainable neurological phenomenon that can take the forms of English, French, or of anything else that people use. Some of the formal rules of grammar can be taught in the classroom, but language as communication must by its nature be learned. On that precept, deaf education must focus its energy and talents.

Some time ago someone devised the slogan, "Talk, talk, talk, talk to your deaf child." Such advice implies an understanding of the nature of language acquisition and development. Unless children, deaf or hearing, are exposed to language, they will not learn it. Unfortunately, for a deaf child, talking is an unclear, ambiguous exposure to the system of oral communication. For too many deaf children, talking simply becomes the blurred and meaningless movement of faces--sometimes perhaps communicating feelings or emotions but never communicating precise verbal messages.

Hearing children learn language through modeling as they develop conceptually. Their experiences guide and foster their command of language. As they become older they become more skilled in communicating not only their physical needs and wants but also in abstracting, that is in expressing themselves intellectually.

Deaf children develop language very much as hearing children do. In a family of hearing people, deaf children have almost no formal language, but they have simple gestures or signals, which can change from day to day. Once the deaf child comes to school, he is exposed to a variety of formal language expressive systems (lipreading, speech, signs, writing), and immediately begins to learn language. His teachers work as diligently as possible to teach him as much as they think he can absorb. He learns to communicate in some fashion,using any (at times all) of the forms he has been exposed to. After eight or ten years he writes better, takes tests, and passes silly notes to girls. He is using language, but it is not English:

> "My nose is maple syruping"
>
> "Mr. Stevens and I scorched our way to school this morning"
>
> "I am my nose"

--these are communications in language, but they are not in English in the formal sense of the name. They do not follow the generally accepted rules of English.

Hearing children learn English because the volume of English they hear is sufficient for them to learn the rules of English. This critical volume of exposure has been heard by the time the child is four years old, long before he is independent of his parents, and before he has matured intellectually. Thus, as his independence and individuality bloom, simultaneously his ability to communicate his own uniqueness develops. While the language that he acquires is common to all, the way that he uses it and what he says mark him as an individual.

Language acquisition for the hearing child is a high-level cognitive, thinking process. The child hears hundreds of examples of the rules; no one states to him one one-hundredth of all the rules. From heard examples of language in practical use the child must deduce the rules. Hearing children are able to express themselves early in their lives in an increasingly sophisticated way. Some children can communicate simple needs before their first birthday (e.g. 'water' or 'milk', even though these sound like wawa and mik). The more complicated syntactic structures forming sentences are used by their second and third birthdays. Deaf children, however, are not exposed to enough English sentences for them to learn English. Furthermore, deaf children have to wait for years to learn simple patterns for expressing the most mundane and common things in their lives. They are not exposed to the volume of English sentences necessary for them to learn the syntax of the language. But because they have the need to communicate, they impose rules of syntax and structure on the words and phrases they know, thereby creating their own form of language (see Goldin-Meadow & Feldman 1975).

This need to communicate demands an orderly, clear, reliable system. Deaf children are no exception to this cultural, psychological, linguistic phenomenon of mankind. As the individual perceives order in his universe, he also perceives order in the language to which he is exposed. The hearing child's need for order and structure is satisfied through the process of learning the language, discovering its rules. Deaf children do not receive enough clear, unambiguous language to determine through example the rules of English. Thus to satisfy their need for order and structure in language, deaf children develop their own syntax , or language system--often derided by educators as "Deaf English".

What some linguists have labeled as a "language freeze" --this aberrant self-created language--and a result of immaturity is actually a "language birth". Although not English, the deaf child's language output satisfies his need for system, syntax, and structure in order to communicate. The individual deaf child creates his own language based on his individual cultural and language experience. The hearing child generally has a language experience similar to that of the majority of people in his culture; thus he acquires through deductive learning the syntax of the majority. But English for the deaf child becomes a second language, while his own self-made language remains his primary means of communicating. "My nose is maple syruping" is actually the result of a creative child's communicating through language with his mother. Schools fail because they cannot teach as fast as the children can learn. Children learn language outside the classroom too. What they learn they bring to the classroom and subtly impose it on what the teacher presents to them. Their instinctual need to communicate produces a form of language that competes with English as a language.

The deaf child in school is constantly reminded of the "other way" to communicate; he is made aware of English not only in the classroom, but wherever he goes: English is there as the language of the culture. The deaf child who develops a language does not need English to communicate to the extent that he is taught it in the classroom. His need does not grow because he is protected by a sheltered environment in home and school. Hearing children have a constantly expanding linguistic environment, through radio, TV, movies, the theater, the printed word, and most of all other people they come in contact with. Such an expanding environment early in the hearing child's life imposes linguistic rules and an unconscious understanding that the culture at large dictates the language to be used. Young deaf children do not have an expanding linguistic environment, and therefore have neither the syntax of English nor the unconscious understanding that the culture at large does dictate the language its members must use.

Most deaf children learn to read and write a little bit in preschool. They learn to read their names and the sentences which note the daily schedule:

"We will go to Art."
"Mr. Palmer will come today."
"We will go to gym today."

When the activities are finished, the sentences are changed:

"We went to Art."
"Mr. Palmer came today."
"We went to gym today."

Day in and day out, the schedule repeats itself, the sentences keep coming, but the environment does not expand. Every ingenious device, game, toy, activity, and instructional system has been tried and will be tried again. But nothing works. The teacher cannot compete with the live, real, gut-level communication, the signs, words, gestures, grimaces, fingerwaves, feignings, that go on between the children. In a few years the child will be sign-talking without regard for the rules and the structures of English, without regard for the carefully patterned sentences that so clearly delineated the days' schedule a few years back. The volume of language received from the teacher through teaching is minimal compared to the volume of language received from other students communicating. Therefore the learning of language becomes a game. The language with the most input wins the affections and the attention of the pupils. The winning language becomes the language of the children themselves, not because human beings have a propensity for one form of language or another, but simply because the language which is presented as the most common and the most usable becomes the language of the community.

If any change is to come in the results of the education of the deaf, contacts in acceptable English must outnumber the contacts children have with other forms of language from other students. Obviously schools cannot and should not prohibit contact among students. They can and should increase the number of meaningful contacts between student and teacher in acceptable English. The more closely the linguistic experience and environment of deaf children approximates that of hearing children, the more likely that deaf children will use English as their own language. Such a language experience and environment must provide the deaf child with the opportunity to learn English through a great volume of exposure to syntactically consistent and semantically meaningful verbal communications. The most likely medium for that is some form of Manual English or signed English (see The Linguistic Reporter, 12,2, April 1970). Signed English accepts the fundamental characteristics of sign language, and imposes English word order and tenses on Sign in a somewhat artificial manner. Signed English is a tool for communicating the substance of life, culture, personal feelings, and interactions; it is not a tool to teach English. It may be a tool through which deaf children will learn English. Deaf children will learn to use English as they experience English through communication. Teachers of deaf children must teach; in fact, they have more to teach than do teachers of hearing children. But they should not begin by teaching language. Deaf children come to school with little knowledge of the world around them and almost no understanding, conception, or inkling of the world removed from them. Polar bears and Indians, science and sewing, and a million more things and ideas are raw material for teaching.

Language becomes an important device in teaching what hearing children have been taught at home through communication. In the process of being taught at home, and later at school, hearing children learn language, the English language, in order to understand, control, manipulate, and change their environment. Language is a tool for hearing children, but it is never an end in itself. Mothers correct and verbalize for their children, but only in the context of a message unrelated to language learning itself. Children repeat the corrected or uncorrected pattern, still bearing in mind the original message. Language (English) is a by-product of communication between children and adults and among children themselves. Through communication the hearing child is socialized, learns the culture, is taught the limits of behavior, the range of expectations, the chances of success, the consequences of failure, and ad infinitum.

Culture is the substance of the communication. Language provides the commonalty to experiences which later make it possible for children to meet new people without a great deal of fear, to shop and know what to expect from clerks--even to know what to say about the loss of a loved one. Language is the most important socialization process. Institutions, primary groups, society depend on language for transmitting their content to their individual members. Without language the individual member stands apart from his culture, because he lacks the experiences which socialize the individual. English, reading, taxes, contracts, and the unrelated concepts of speed, independence, wealth, and sacrifice are culturally bound. Those who are not in some degree part of the culture cannot read. Deaf children cannot read because they are in a cultural limbo. They are not members of their parents' culture, nor is there a culture which they can easily join. Reading is not looking for facts on a page, or finding antecedents. The printed word is a verbal cue to thinking. Unless the reader knows the culture of that particular language he cannot read, because the printed word is an expression of that culture. Deaf children cannot and do not read because they are not socialized into their culture, and consequently they do not have the command of English necessary for reading.

Human beings communicate to satisfy needs. In the process of communicating they learn the language of their culture, which becomes an efficient system for satisfying present and future needs and wants. The language and the culture are both so complex and full of nuances that rote memory cannot serve the individual effectively. Deaf children are taught language in a very artificial, rote way.

"Sally run."
"What did Sally do?"
"Sally ran."

is good English but extremely poor communication. In the context of the classroom the sentences are void of content and message. The deaf child must memorize the structure, the syntax, and the grammar because there are no message clues to help him learn the language. The language that is taught is non-functional because it does not communicate anything tangible; there is nothing in it that the child can take hold of and use, and in doing so learn language for future use. The language of the classroom does not communicate, and therefore it cannot be learned as a language. On the other hand, language that does communicate is learned. Learned not on the first, second, third, or even, fortieth time, perhaps, but eventually learned because it is purposeful, because it satisfies a need and therefore becomes a tool.

The child learns language because the experiences which were language based communicate something that depended on language. Such experiences become frames of reference. Such experiences become sources of conceptual understanding and models for language use. "The superintendent is driving fast" implies more than just action and velocity. "The horse is running fast" likewise tells more than just whether the horse is moving. The superintendent is probably going faster than the horse, but is wrong in doing so. The horse is probably going faster than all of the other horses, and thus is loved by the track fans for doing so. Such values, judgments, and opinions cannot be taught; they must be learned. The child who has not learned the values, judgments, and opinions of his culture surely cannot understand them when they are presented in the printed word.

A frame of reference is built slowly through many unplanned experiences and without regard for quality. Frames of reference are created even though the child has many conflicting and contradictory experiences. "Fast" is not simply a description of velocity but an opinion about speed and its appropriateness. Deaf children must have experiences wherein other people around them communicate not only a description of the moment but also their feelings, opinions, and values relating to that experience.

Communication becomes the creator of a wealth of attitudes and opinions that help growing children understand the culture as well as learn the patterns of the language. When the child refers back to an experience, he does not recall the rote memory work of the classroom, but rather the message that was communicated through the language of the experience, and in the process he recalls the language pattern.

Deaf children must be given language simultaneous with their experiences, not because language necessarily helps them understand the experience, but simply because it is a cultural imperative that language be part of the experience. The best thing formal education could do for deaf children is to stop trying to make them into sentence remembering machines--that won't work--and begin letting them learn language as they learn about themselves and the world through communicating with others.

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PART TWO: 10

PANTOMIME & GESTURE to SIGNED ENGLISH

Marvin B. Sallop

The educational philosophy called Total Communication has been adopted by many schools for the deaf, and more are joining the movement each year. It was pioneered at the Maryland School for the Deaf and is clearly stated by that school's superintendent:

> Total Communication is the RIGHT of a deaf child to learn to use all forms of communication available to develop language competence. This includes the full spectrum, child devised gestures, speech, formal signs, fingerspelling, speechreading, reading and writing. To every deaf child should also be provided the opportunity to learn to use any remnant of residual hearing he may have by employing the best possible electronic equipment for amplifying sound. (Denton 1972)

The terms "child devised gestures" and "formal signs" are perhaps easily understood; however, utilizing gestures and signs as teaching tools are processes not so familiar. First, sign language, or American Sign Language (ASL) and "signs" should not be confused. ASL is a language with a syntax, a grammar of its own distinct from that of English. Manual signs, however, can be used as equivalents of (many of) the words in grammatical English sentences. Second, the elements of Total Communication are not segmentable, separable from one another in time, but are simultaneous and interdependent. In this paper I will focus on one of the elements, ASL, otherwise "formal signs", and its use within a Total Communication environment to help pupils in one class acquire something like English word order. I will describe the language instruction given in a special class at the Kendall School for the Deaf, particularly its format and the results, from a linguistic point of view.

Some idea of the initial competence of pupils in the class can be gained from this comment by the cooperating teacher:

> The language problems in this class are very great. The children are hampered by extremely limited vocabularies. In spite of the fact that most of the children are reading at a first grade level, their expressive language is much lower. In most cases they attempt to explain what they have seen by gestures, pantomime, and a few formal signs. (Language-reading lesson plan, 23-26 March 1970, W. Wheatley)

A more detailed view of the pupils' language level is given in the notes I took during the early stages of my work with this class:

> 1 (gesture or pantomime) finger pointing to the hall, child walking, face smiling with mouth open making grunting sounds; finger making a 90° turn to the left, child walking and making a turn to the left, face smiling with mouth open making grunting sounds; finger making another 90° turn to the left, child walking and making another turn to the left, and then another left turn, face smiling with mouth still open making grunting sounds; then the child stops walking, continues to smile, and lifts brows in a question.

Is this language? Hardly. Communication? Yes; in 1, the child is pointing out the way to the school library from the classroom. He concludes by asking, with facial expression, if his performance is correct. His attempt just before that noted to respond to the word library written on the blackboard had been to point out the window. I pulled his hand down and told him, signing and speaking at the same time to talk to me and tell me by talking to me. The result of his next attempt is recorded above in 1.

> 2 child makes a name sign and wrinkles the brow.

The child performing this came into the room as I was standing at the blackboard. He looked around the room and performed what is described in note 2, to ask me 'Where is Mr. Wheatly?'

> 3 child signs DIRTY then a name sign 'Simon' while smiling and nodding his head.

The child described in 3 was addressing another pupil in the room and making a comment about a third pupil not present in the room, to wit, 'Simon is dirty.'

4 child in body stance of defiance, feet apart, signs DIRTY and FIGHT and points to another child, YOU, while lipspeaking the words and speaking the words "dirty fight you;" her face showing anger, brows pushed together.

This child had been hit while she was not looking , during a free-time mock boxing match in the room. She was saying, in colloquial English, 'You fight dirty.'

These examples have been selected and ordered to show, without the need for long theoretical argument, that children in this special class were operating at several levels of linguistic competence. At least their performance suggests so. Note 1 bears out teacher Wheatley's comment about gestures and pantomime: there is hardly a linguistic symbol in the whole performance, although the facially expressed question at the end would be correctly interpreted by most observers from our culture. The performance in note 2 seems to be a combination of sign use (i.e. a more or less linguistically coded motor sign) with facially expressed questioning gesture, in this case requiring the interpretation 'where?' In note 3, "formal" or conventional signs of ASL supply both state verb and patient (to use the terminology and form a semantic structure as in Chafe 1970). Or to symbolize a comment and topic, or a predicate 'dirty' and a subject 'Simon' in traditional school grammar terms. Adults fully competent in ASL and in English might make use of the pattern of 3 to make a similar comment; but taken with all the other evidence provided by regular observation of this child, what is described in 3 seems more akin to a Pivot-Open grammar first described by Braine (1963). Note 4, with three signs besides kinesic expression and spoken or lipspoken syllables, comes closest to full language competence. It is a well-formed structure of ASL, presumably with the same base as the English surface structure You fight dirty, from which it differs in order of elements.

The first step in designing language instruction for this class was to recognize a hierarchy of levels in language competence, next to identify the level of each child, and then to pull, push, and prod him to the next higher level.

Although the instruction was directed at the individual child and took place in the simultaneity of a full classroom, I will try here to present it in separate steps. First, for the child who communicated with gestures and pantomime, even though his receptive competence was in "straight English" (i.e. standard English spoken and simultaneously represented with signs for words), I refused to accept from him any gestures or pantomime that could not be considered to belong to ASL. I gave this child negative reinforcement by not watching him when he wanted to tell me something, unless he used signs. When he held onto me and I could not avoid watching him, I hit him lightly on the head or lightly slapped his hands. This is not as cruel as it sounds, and it was the only means effective. I would not let him get out of his seat to communicate by moving around in pantomime or acting out. He could communicate only from his seat. I supplied signs when he expressed a need for them and provided negative reinforcement when he did not use signs or tried to revert to gross gestures when I knew that he knew the signs. For positive reinforcement, I kissed him, hugged him, played with him, gave him piggy-back rides, candy, gum, and tick marks on the blackboard. (My cooperating teacher also discouraged his gestures and pantomime in the same way.)

This child quickly understood that his gestures and pantomime were no longer acceptable as means of communication and that we would accept only genuine signs. He also learned that he was not under pressure to communicate in speech, although we did encourage him if he tried to form the words matching the sign with mouth and lips. Without the pressure of being forced to produce speech, he was able to concentrate on the acquisition of signs in structures, hence language. At the end of six weeks, he was no longer communicating with gestures and pantomime but instead with Pivot-open or Topic-Comment sign patterns and even a few more elaborate patterns. (It is interesting to note that as this pupil learned a sign, i.e. incorporated it into his production, he subsequently lipspoke, and later spoke, the word equivalent of the sign, with speech production assistance the teacher provided.)

The other pupils in the class seemed to know that this child's communicative performance was below theirs, and when they noticed that Mr. Wheatley and I were no longer accepting his gestures and pantomimes, they too refused to accept them from him, providing him with signs from their own level of linguistic competence. This had a snowball effect on the entire class. Each pupil offered a helping hand to the pupil on a linguistic level below him; i.e. each was out-of-awareness aware of the linguistic hierarchy.

The children who mixed signs and gestures were treated with pretended misunderstanding; e.g. when a child came up and signed WATER with a facially expressed question, I would reply that I was not thirsty, or that it was not raining, or that I did shower last night, or I praised him for showering last night, or I told him that I did not want the blackboard washed, or I said, "No, we will have milk with our lunch." His usual response to these exhibitions of my denseness was an expanded repetition of his initial question, often in a Pivot-Open or Topic-Comment pattern. He might ask in signs, 'water me' or 'water me there' or 'water me go' with a questioning face.

Note that this pretended misunderstanding of mixed sign-gesture or one-sign utterances was reserved for those children who were already able to communicate thus (the performance described in note 2 above). The child moving up to this level from pantomime and gesture was of course more positively responded to when he reached this sign stage. It is interesting to note also that when I faked non-reception of a message, the children using holophrastic (Menyuk 1969) or mixed expressions did not revert to gesture and pantomime. I take this as further evidence of their implicit recognition of the hierarchy in language levels. I was prepared to give them the appropriate negative reinforcement for reverting to gesture and pantomime, but these children never did revert.

At the next level, the children who were communicating in Pivot-Open sign structures were also treated with communicative blocking. I misunderstood everything that they tried to tell me until they added additional signs that showed they were using a more advanced grammatical structure. For example, a child approached me and asked in signs and speech, 'house Washington you,' with an inquiring look. I replied that there were many houses in Washington. He shook his head for 'no' while lipspeaking _no_, and then asked again signing and lipspeaking, 'house you sleep Washington' with the same look of inquiry. This sequence of signs fits one pattern of sign order in ASL, and I indicated that I understood his question by replying that I lived at Gallaudet College. He ran off, happy indeed, to inform the other members of the class that Mr. Sallop lived at Gallaudet College.

These techniques were used during six weeks until all these children learned that they could not communicate with me or with Mr. Wheatley unless they used more appropriate patterns of language than those they had been using. By the end of six weeks they were all communicating with both teachers on a level like that described in note 4 or that in the final question at the top of this page. Unfortunately they continued in their communicating with each other to use the simpler Pivot-Open structures. I tried to discourage this by butting into their conversations and misconstruing what they had said. As long as I was in the conversation they remained on the higher syntactic level. When I left the conversation, however, they reverted to their Pivot-Open patterns. I believe that if I could have been there all year to butt into their conversations, they would have moved up a level. Six weeks was not enough time to condition them to drop all Pivot-Open utterances and use more elaborate structures spontaneously with each other. [Editor's note: There may be more involved here than time and operant conditioning; in Chapter 3 there is more than a strong suggestion that children switch codes both for age and for situation; the presence or absence of a teacher might very well have been the trigger for switching from a classroom-appropriate language level to an age-appropriate level—and we are told the age of the children here.]

The most difficult language teaching problem I faced in this class was that of three children who were already communicating in full ASL patterns with me, Mr. Wheatley, and each other. The task with them was to shift their ASL syntactical patterns to those of standard English when possible, and to enrich their ASL performance by enlarging their vocabulary and repertoire of patterns for meanings they were striving to express. I achieved only limited success in this task. The child who approached me with the signed, and lipspoken or fully spoken, question WATER I GO PLEASE?

would be told in signs and speech, "Ask me in English." I made it a point never to ask him to say it "properly;" for his communication to me is a well-formed ASL sentence. What I was requesting was a translation of that sentence into another language, i.e. standard English. My position of course constitutes a de facto recognition that English is a second language for deaf children and that ASL may be their first and appropriate language. Any demands made in the form, "Repeat that properly, please;" were for an improved construction in sign language, not for English translation.

At the end of only six weeks I doubt that many of the children had realized that we were in fact demanding two languages from them, yet those three children who were generating appropriate constructions in ASL were being guided into learning standard English as a second language.

English as a second language was presented to the class in two ways, informally and formally. First, the major portion of my language instruction was given to the class throughout the entire school day. I signed "straight language" to them, and by doing so provided a model (with words signed) of standard English. I responded to their questions in standard English. I encouraged them to rephrase their questions in standard English, to make their comments in standard English, no matter what we were doing—math, recess, having lunch, or even standing in the hall. Second, I had the class for Reading, and any formal instruction I gave was in the reading period. They also had formal language instruction from another teacher the first hour of each day, in her classroom. There she worked on the Roberts (1958) formulas and patterns. A side effect of this work was that the children were exposed to the syntactic constructions of English. No one ever told them that this was their language. They were told only that this was English, and for that hour they would work and reply within the Roberts frames. The children who could make well-formed ASL sentences were here being given models of English, which they could use when they were required to translate from Sign to English for me. The children at lower linguistic levels were not showing any carryover outside the Roberts worksheets, but I do not feel that it hurt them to have had this exposure to standard English.

The three pupils I was requiring to translate their utterances into English were also being taught to expand their sign language capabilities. I provided them with an expansion of their sign vocabularies whenever a sign was needed. This was highly unstructured: I simply supplied them with a sign or structure when the need arose in their own communication of a message. Nevertheless an interesting thing started to happen during my last week with the class. These three children, and no others, started to pick up and use signs of mine that I had not been requiring them to use. Because I used signed English continually, I had been signing, instead of fingerspelling, was, were, is, are, am, and many other words of English that do not have ASL signs, but which are given sign form in Manually Coded English and signed English (i.e., varieties near the English end of the continuum; see Chapters 1 and 2). Spontaneously the children began using these signs in their own utterances. I had not required it of them; I had only used the signs out of habit in my communicating with them. Theory states that there is a lag of at least several months between receptive competence and expressive competence; however, these three children started to give me back these signs in only five weeks, without any pressure on them to do so.

The fact that only these three children were using these signs seems to offer more support for the idea that there is a hierarchy in signing competence. The other children were apparently incapable of doing the same because of their appreciably lower linguistic level.

To summarize the linguistic approach to language acquisition I used with this special class, first, they were indeed special. They had been misdiagnosed as brain damaged and mentally retarded until they were eight or nine years old, and until that time they had received only custodial care and perfunctory teaching. At that time Mr. Wheatley, whose background is in mental retardation, was hired specifically for this class. He found in a very short time of working with them that they were neither mentally retarded nor brain damaged, and that they had only some behavior problems and learning disabilities. They then could communicate in gestures and a few signs. They could recognize their printed first names, but did not know their last names. They could not add one and one nor identify many colors. In the year and one half that Wheatley worked with them, they had learned to read at first grade level (with no exceptions) and to write with a limited, concrete vocabulary. At the time of my six weeks with them their ages were between nine and eleven.

Helping these children reach higher, more mature levels of language competence began with the hypothesis that a language hierarchy exists in signed language: at its base is pantomime and gesture, at the next level holophrastic signs and signs mingled with gestures, at the third level signs combined in simple Pivot-Open structures, at the fourth strings of two or more signs in more elaborated Topic-Comment constructions, at the fifth level signs ordered in accordance with the grammar of ASL. This is the top of the hierarchy for sign language. Once a child has reached this fifth level, he is ready to move from a sign language L form or variety to a sign language H variety (Stokoe 1970); the latter can be identified as signed English or Manually Coded English. Moving to this variety of output entails learning English as a second language from the basis of ASL as the first language, and more specifically requires knowing where the shifts in syntactic constructions must be made and how to make them.

This was the approach that I followed in the six weeks that I spent with this class. There was no formal presentation of the morphology of English, or of sign language; however, quite a lot of morphology was presented informally. Learning signs as units of the process of communicating ideas and as replacements for gestures and pantomime, and seeing continually sign language from the teacher in signed English form offers the child morphology of both Sign and English in a synthetic approach. The child receives and transmits the whole message, gleans meaning from the parts, and is introduced to the forms of the units of both languges without being subjected to formal instruction. This should stand him in good stead in an extrapolation of the language approach already begun. When the child has reached the sign linguistic level at which he is ready to learn English as a second language, he has already had exposure to English morphology, and this exposure can serve as a basis for more formal instruction. Once he has taken these first steps toward linguistic competence, the elements within Total Communication can all come into play. The child who learned to sign FISH in class also soon learned to write fish, to read it, to fingerspell it, and to speak it. Although dealing here with only some of the elements of Total Communication, I emphasize in concluding that all elements used as simultaneously as possible are the means by which we can help the deaf pupil gain the language proficiency he needs in life.

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PART TWO: 11

LANGUAGES AND LANGUAGE-RELATED SKILLS IN DEAF AND HEARING CHILDREN

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Introduction. Language can be studied from widely differing perspectives, and this diversity of viewpoints often forces new conceptions of the nature and use of language. An illustration of this point is the recent experimentation with teaching signs of a sign language of the deaf to chimpanzees (Gardner & Gardner), which has focused attention on the symbolic, developmental, and productive aspects of language and helped to suggest criteria for deciding what constitutes language behavior. Traditionally, most linguists (e.g. Bloomfield 1933, Hockett 1958, Sapir 1966) had stressed the sound system (phonology) as a fundamental characteristic of language. But evidence from recent analyses of sign languages of the deaf requires the rejection of this kind of phonological criterion (e.g. Hockett 1978).

The recent analyses show that a sign language may be a "true language" (see Chapter 2 above), comparable to any spoken language in its use of a finite, though complex, set of units and rules that allow the generation of an unlimited variety of sentences. Any concept, no matter how abstract, which can be expressed in a spoken language, can also be expressed in a sign language. The rates at which ideas are conveyed in sign and speech transmission are also about the same. From recent research it is becoming clear that sign languages and spoken languages are similar not only in their fully elaborated forms—as used by fluent adults—but also in their acquisition stages for young children.

After a discussion of these structural and developmental aspects of sign language, we review factors that influence the success or failure of a child--normal or handicapped--in acquiring either speech or sign. We then discuss the relationships among different ways of processing English or Sign [i.e. a specific system of signing, as English is a specific system of speech], along with the performance of deaf children in reading, writing, and educational achievement. Finally, we consider the implications of what is known about children's language and cognition for theories of development and programs of education.

Sign language structure. The principal means of communication in the deaf community is sign language. Actually, many sign languages are employed (Battison & Jordan 1976). American Sign Language (ASL) and the sign languages used in other countries differ both in the construction of individual signs and in the structure of their sign sentences. However, each of the different sign languages appears from informal observation and early referential communication experiments (Jordan & Battison 1976) to be as effective as spoken languages in transmitting messages. A study by Bellugi (1972) showed that not only could similar information be communicated through ASL as through English speech, but also that the information was conveyed at virtually the same rate.

American Sign Language is the colloquial sign language of the deaf in the United States, and it is usually the first language that a child of deaf parents in America will acquire. Two other varieties of an ASL-related sign language, Signed English and Manual English, are often used in schools for the deaf in the United States and in formal settings where both deaf and hearing persons are present. Both these language varieties depend directly on English grammatical structure, and they probably should not be considered distinct languages from English. Fingerspelling, also widely used, is the complete spelling of English words with a manual alphabet code. In this paper we will center our discussion on American Sign Language, because it has been the focus of most studies of sign language use and structure. After discussing the formation of individual signs we will consider what is known about grammatical structures in ASL.

Each sign in ASL is a unique combination of a small number of distinct aspects of visible activity which have no meaning in themselves. Stokoe (1960) specified three different aspects of signs that distinguish a sign in ASL from some other sign: the place on or near the body where the sign is performed; the configuration (including its orientation) of the hand or hands; and the movement or the change in configuration of the hand or hands. Stokoe called the location aspect the tabula (tab), the hand configuration the designator (dez), and the movement aspect the signation (sig). Altogether he identified 55 different sig,' dez, or tab aspects (or cheremes) in ASL, and viewed their role in ASL as somewhat analogous to that of phonemes in vocal languages. Although this classification was limited to description of ASL, it is quite possible that there may be a larger, universal set of gestural features from which ASL and other sign languages draw subsets used in sign chereme formation (Fischer 1974). The cheremes used in forming ASL signs enter only certain sorts of combinations, and thus it should be possible to specify whether any newly-constructed sign is a well-formed or grammatically acceptable sign in ASL. Klima and Bellugi (1974) show that persons who know ASL are sensitive to such a notion with reasonable cross-informant reliability. Chinese Sign Language signs which did not closely resemble any particular ASL sign were classified by subjects in terms of similarity to signs used in ASL. Those signs judged as highly dissimilar to ASL tended to be "impossible" signs within the formational system of ASL.

A misconception that has been shared by linguists and laymen alike is that the sign language of the deaf is largely pantomime, iconic. In fact, the meanings associated with most signs in ASL are usually arbitrary, just as the meanings of most words are arbitrary in spoken languages. Thus, an observer unfamiliar with a particular sign language would be unable to follow the conversation of deaf persons using that language (Jordan 1975, Jordan & Battison 1976, Battison & Jordan 1976). However, once the meaning of a sign is given, in a number of cases it will appear to be iconic. An example is the sign BIRD: The index finger and thumb are extended and opposed with the back of the hand at the signer's chin, in imitation conventionally of a bird's beak (Klima & Bellugi 1974). Finally, it appears that even this metaphoric aspect of signs is gradually disappearing. Analyses of the changes in signs over the past one hundred years indicate that many of those signs that originally had a pantomimic or imitative basis are becoming more conventionalized and arbitrarily symbolic (Frishberg 1975).

Investigations of differences between speech and sign promise to cast light on how people process information, and perhaps even on the origins of human communication. One difference between oral and sign language is that certain signs and sign cheremes occur simultaneously, whereas words and morphemes are always temporally ordered. Another difference is that facial gestures play a much more important role in sign language, combining with the manual signing component to establish a dual channel kind of communication. Specific movements of the eyes, mouth, and head are either produced alone or simultaneously with the manual signals in order to help convey the full meaning of the sign language sentence (Stokoe 1972). As one example of the role of these components, if a smile accompanies certain sentences in ASL (e.g. "I don't understand that"), the sentences are considered ungrammatical (Fischer 1974). It is also possible that speech and sign may have emerged at different points in history. Several investigators (Hewes 1973, 1974, 1976, Stokoe 1974, Kimura 1974, Kendon 1975) have suggested that man's first language was most likely to have been a gestural one.

Studies of the grammar of American Sign Language have usually been approached in two different ways. One approach has been to compare ASL with oral languages, usually with English, and to point out the many dissimilarities between the languages. This approach has often resulted in pejorative characterizations of sign language as a system with little grammatical structure, since many syntactical forms and constraints on word order present in English are absent from ASL. Sign language, for example, has no signs for articles, although in certain situations the sign THAT is used as determiner with specific objects (see Crutchfield 1972). And only those English prepositions that have a locational aspect have a corresponding ASL sign, while others, such as by and of do not. Nor is there a sign for the copula or linking verb (i.e. any form of be) in ASL, although the sign TRUE may often be used to emphasize the reality of something. Another easily recognizable difference between the two languages is the absence from ASL of inflections exactly parallel to English inflections. Since ASL does not inflect its verb signs for tense, the sign SEAT is used where sit, sits, sitting, and sat would be used in English. ASL is also dissimilar in that it does not indicate passive voice and different grammatical moods of verbs. It should be apparent from the examples just considered that grammatical information conveyed in English is transmitted very differently in ASL.

The second approach to understanding the grammar of American Sign Language has been to focus on the many unique operations ASL uses to convey syntactic and semantic information, These unique operations appear to be related to the manual and visual modes of production and reception of signs. Changes in the speed, location in space, direction of movement, and repetition of signs produce variations in meaning--variations which in English are carried by inflections and word order. When telling a story, a signer will often attempt to develop an imaginary stage or notion of setting, establishing the location of different persons and objects within the boundaries of this "signing space" (Friedman 1975). The signer will then refer back to specific positions in this sign space in order to indicate relations between signs in a sign sentence. The development of this visual setting (spatialization) is especially important and effective when the signer is using "directional" verbs (see Chs. 1 & 6), as this allows the signer to compact a great deal of information in one sign. For example, the signer can vary the movement of such directional sign verbs as GIVE or HIT to indicate who is doing the acting, who is the recipient of the action, and the location of the action. (Although this directionality of sign verbs, once seen, is iconic of the direction of action from agent to patient, there is evidence in deaf children's acquisition of ASL that this neat spatial-semantic fit is a syntactical transformation neither immediately transparent to the learning child nor built into the child's utterances until a late stage; Ellenberger & Steyaert, in Siple, 1978, 261-269 [New York, Academic Press]..

Spatial relations also play an important role in indicating the time of an event or action. Frishberg and Gough (1973) described an imaginary time line that runs forward and back (future and past) from the signer's mid-cheek. In addition, there are other restrictions on sign order besides those arising from reference to spatial loci. Fischer (1974) observed that ASL sentences are predominantly of the form subject-verb-object, and that, as in English, most prepositions come before objects and adjectives before the nouns they modify. The freedom of word order depends, however, on the kind of agents and objects employed. If the sentence is non-reversible in terms of agent and object roles--as in a sentence about a "man" who "pays bills"--the word order is free to vary widely, and the sentence remains grammatical. In such sentences subject-object-verb order is allowed; whereas with reversible subjects and objects (e.g. man and child used with a verb like notice) subject-object-verb and other orderings of these three elements are ungrammatical. An analysis of this sort approaches the kind of specificity needed in descriptions of ASL syntax, but we are presently far from having an adequate description of the whole syntax of Sign.

Acquisition of sign language. Cross-cultural comparisons of young children's acquisition of their native languages have revealed many similarities and few differences in the language learning process. This outcome might be best understood as the result of universal underlying cognitive or linguistic capacities. However, until recently, no study had compared the acquisition of a non-oral language (i.e. sign language) with the acquisition of oral language. Similar patterns of acquisition for both sign language and oral language would suggest underlying cognitive skills common to both. In addition, an analysis of the acquisition of a visual-motor language could help identify how each stage in the child's development of cognitive skills and of motor and physiological capacities affects his language acquisition.

The results of three recent longitudinal studies of sign language acquisition in young deaf children support the conclusion that the stages there closely parallel the development of spoken language competence in hearing children (Klima & Bellugi 1972, Nash 1973, Schlesinger & Meadow 1972). These conclusions are based on observations of deaf children that include their early learning of the meanings of individual signs, their combinations of these signs to express different semantic relations, and finally the systematic, gradual growth of these early combinations into more mature grammatical usage.

The youngest of four children observed by Schlesinger & Meadow was eight months old when the study began. This child soon acquired a large vocabulary of signs, and by the time she was 19 months old, had used 117 different signs. For this child and for other deaf children acquiring Sign, the early signing was similar in two respects to a hearing child's early word use. She often overgeneralized the referential aspect of her early signs; and, in addition, a number of her early signs were holophrastic--expressing or suggesting complex ideas or whole phrases in a single sign. The signs DOG and BYE were among the examples of her overgeneralization. DOG referred to real dogs, to a "Doggie Diner" restaurant, and to other animals. At first the sign BYE was used to indicate any approach or departure--a sign for 'hello' appeared later in her sign vocabulary. Klima & Bellugi (1972) and Nash (1973) also noted a number of overgeneralizations of signs in their young subjects.

Although the development of a sign vocabulary is an important first step in a deaf child's acquisiton of language, it is through combining signs that the child gains an ability to convey accurately a wide range of different meanings. And it is the data on sign combinations that provides the strongest evidence that similar patterns of acquisition hold for speech and sign.

The children employed a number of two-sign combinations that closely resemble the "pivot-like" constructions reported in Braine (1963) and Slobin (1971), in which some words (e.g. please, my, more, come) served as "pivots" and tended to occupy either the first or last position with regularity. Consistent with Bowerman's findings (1969), the pivot signs occasionally occurred alone (e.g. please) or in combinations with other pivots (e.g. more please). More detailed analyses revealed that a full range of semantic relations were expressed in the children's early combinations of two or more signs. Examples below are drawn from the following children's observed performance at about age three: "Karen" (Schlesinger & Meadow 1972), "Marc" (Nash 1973), and "Pola" (Klima & Bellugi 1972).

I. Agent, Action, Object Relations
    Get milk shake store. --Marc
    Daddy (take off) shoe. --Karen
    Boy hit boy. Man work. --Pola

II. Dative
    Give me orange. --Pola
    Where is woman who gave me balloon? --Marc

III. Negation
    No bed. No wet. --Karen
    Eat no. No touch. Not fish, duck. --Pola
    Be careful don't knock over. --Marc

IV. Attributive
    Bed shoes. (for slippers) Pretty lights. —Karen
    Many candy. —Pola
    Where is red ball who puppy chews? —Marc
V. Possessive
    Move TV my room. —Marc
    Me napkin. —Pola
    Barry (Barry's) train. My sweater. —Karen
VI. Locative
    Letty, come home school. —Pola
    Daddy come later. Daddy work. —Karen
    I think that Daddy is home now. —Marc

The sign constructions above, along with many similar constructions, appear to resemble closely the structures and the meanings in children's early speech (cf Bloom 1970). The range of meanings and precision in expression of meaning increased as language developed further. With increasing age and experience with Sign, the deaf children's vocabulary rapidly expanded—in many cases doubling in size in the space of several months. With this increase in vocabulary, the young deaf children also produced and comprehended progressively longer and more complex sign sentences.

An index of the progressive development of structural complexity is the children's mastery of the signs for negation. Not only do the techniques that the children use to express negation change, but the changes occur in a stagewise manner comparable to that described by Bellugi (1967) for hearing children. Marc first expressed negation by shaking his head before a sequence of signs or simultaneously with making a sign. Next he acquired the sign NOT and later began to use the separate quantitative sign NONE. Finally, Marc appropriately utilized an incorporated negative marker in signs such as WON'T and CAN'T within his sign sentences. Similarly, Pola moved from very simple initial forms of negation, such as head-shaking, to the use of signs NO and NEG (Klima & Bellugi 1972) to negate sentences, as in EAT NO, DADDY RIGHT NEG, and TOUCH NO. With further development she incorporated a wide range of negatives in her sentences, including NOT, NO, NEG, CAN'T, NONE, and NOTHING. Thus the progress of these children parallels hearing children's progression from simple negation (no eat that; eat that no) to increasing differentiation of new words for negation together with increasingly appropriate integration of such words into sentence structures.

An interesting example of syntactic overgeneralization by Pola was her production of a sign clearly meaning 'You fingerspell to me'. This sign was directed in space to show action from mother toward child, so that in the manner of directional s.l. verbs subject ('mother') and object ('signer') were symbolized. However, adults do not incorporate subject and object directionally in the verb FINGERSPELL. Pola thus appears to have created a new sign by overgeneralizing the subject-object indicating directionality utilized in one class of ASL verbs (see pages 66 and 67 above).

Improved sign usage by the deaf children did not seem to be the result of specific training. Their parents usually did not correct their arrangements of sequences of signs, their inappropriate repetitions, or their overgeneralizations of syntactic patterns (Klima & Bellugi 1972). This failure to correct most ungrammatical signing corresponds with the behavior of parents interacting verbally with their hearing children's output of speaking (Brown & Hanlon 1970). However, Cicourel & Boese (1972) observed that deaf parents do sometimes expand their child's "telegraphic" sign utterances, filling in the incomplete signing with what they believed were the missing elements. In sum, the limited data available suggests that for the child learning sign language, as well as for the hearing child learning spoken language, parents do not give direct feedback on grammatical correctness, but they do provide feedback on meaning, and they produce "expansions" or other replies which may help illustrate appropriate syntactic structure.

Throughout the observed periods of sign development much of the playful quality of language exchange between mothers and children was present for these young signers and their mothers. It is thought that playful interaction at very early ages may contribute to the development of language. Within the first months of life, for deaf and hearing children alike, structured patterns of gestural and motor interaction between adult and child have been observed (cf Stern & Jaffe 1975). Such patterns could serve as an important basis for later, more complex, linguistic interaction.

Aphasia and deafness. Investigation of aphasia, or language loss, in deaf persons might provide clues to the cerebral nature and "location" of sign language processing. If comparable lesions in the deaf affect sign language usage in the same manner as they affect language skills in hearing persons, then this result would be evidence of similar neurological structure and organization. But because sign language is a visual-motor language, it is quite possible that it would be processed in a different location or locations in the brain. Indeed, the existence of such a separate cerebral location for gestural communication, similar to but not identical with that for speech, was first hypothesized by Hughlings Jackson nearly a century ago. Unfortunately, the limited number of reported cases of aphasia in deaf persons, and the often accompanying lack of information about the locus of the lesions or the form of the patients' primary language do not provide an adequate basis upon which to assess Jackson's hypothesis.

Several conclusions do however follow from examination of the few reported cases. First, those deaf persons who had disorders of manual communication also had evidence of left-hemisphere damage (Kimura 1974). Such incidence of damage to the left hemisphere would of course be expected in cases of trauma induced aphasias in the general hearing population. Second, there is evidence of differential impairment of various means of communication used by these deaf patients. One subject (Douglass & Richardson 1959) showed more serious impairment in her signing than in her fingerspelling. The opposite result of less severe disruption of sign language than of fingerspelling was reported in three other cases (Critchley 1938; Sarno, Swisher, & Sarno 1969; and Tureen, Smolik, & Tritt 1951). The patient studied in the last of these recovered facility in both sign language and speech simultaneously, but differential impairment of speech and signing was evident in the other two patients and in an individual observed by Battison & Markowicz (1974). These varying patterns of deficit-after-trauma severity and modality of communication might best be explained as resulting from differences in location and severity of neural damage. A third conclusion is that the overall patterns of loss of language and then the gradual progress toward recovery of it are quite similar in both deaf and hearing patients. Finally, several of the cases revealed an absence of general motor impairment, or apraxia, in the presence of sign impairment. This finding suggests that a sign aphasia should be considered a genuine language loss and not a motor disorder.

One further implication of the finding of differential impairment of communication modalities in deaf persons is that, if hearing persons lose some or all of their ability to use speech, they may still be able to acquire some facility in the gestural sign expression of language. And, similarly, it is conceivable that when ability in signing is lost, language therapy might be effective in another mode; e.g. writing or geometric symbols.

Sign acquisition by speech-limited hearing children. When a hearing child fails to acquire spoken language, the reasons for the failure may lie in factors that specifically concern speech. At present it is not possible to make even an educated guess about the numbers of children who have language-learning difficulties that block speech acquisition but may not block development of language in another mode. Accumulated observations on retarded, autistic, and other speech-limited children show that when little or no progress in speech acquisition has been made, progress in sign language acquisition is sometimes possible. We shall review programs demonstrating such progress and also give a brief account of prior work on teaching speech to autistic children.

Ideally, accounts of sign acquisition by speech-limited children should provide clear detail of the children's level of speech production and speech comprehension before acquisition of signing begins. In addition, progress in constructing sign sentences should be related to context--as in the above described accounts of acquisition for deaf children--so that emerging semantic relationships can be determined. Since these conditions rarely have been met, it is often not possible to know either the theoretical implications or the practical implications of reported results.

In infantile autism the failure of the child to develop communicative language skills has long been recognized as a symptom. Indeed, the disturbance in language and symbol use has been considered by some investigators to be the primary handicap of autism, from which the social and behavioral abnormalities arise (Churchill 1972, Rutter & Bartak 1971). Lovaas, Berberich, Perloff, & Schaeffer (1966) reported speech in previously mute autistic children gained through a behavior modification program emphasizing reinforcement of imitative speech. However, children who received this therapy seldom went beyond the trained utterances to spontaneous generation of new sentences comparable to those of normal young children. More generally, autistic children typically have shown only limited progress toward the full acquisition of speech. Spontaneous, rule-governed sentences at the level of production attained by normal five-year-olds have rarely been the result of such programs.

Two recent studies examined the progress in sign acquisition made by autistic children. In each study teachers used both speech and sign language, but the children made significant advances in productive language only in sign language. Creedon (1973) reports on 21 children. Estimates of their language levels ranged from 4 to 24 months at the onset of extended training, when the children were four to nine years old. From the information provided it is not possible to determine clearly for any child the achieved level of language mastery in signing nor how it relates to initial speech skills; although there is a rough indication that children who were relatively advanced in signing were also relatively advanced in initial speech skills. What is clear is that the children learned many signs and sign combinations which appear to reflect many different semantic and syntactic aspects of language. Some spontaneous uses of sign sentences are reported, but there is no separate analysis of spontaneous sentences as opposed to those involving direct instruction or imitation.

In the second study (Bonvillian & Nelson 1973, 1976) considerable progress in sign language was made by a mute nine-year-old autistic boy. Earlier, unsuccessful attempts to teach this boy speech included a computer-interaction language program and operant-conditioning techniques. Although the child initially lacked any productive language and any comprehension skills beyond the one word level, in six months of sign training he acquired a vocabulary of more than 50 signs. More significantly, these signs were combined in spontaneous statements reflecting a range of semantic relationships comparable to that shown by young hearing children acquiring speech or young children acquiring sign language. In addition to his acquisition of sufficient components of a language system to allow frequent dialogues with others, this boy also showed improved behavior on a number of other dimensions. His incidence of soiling and of temper tantrums declined dramatically; his attention span and social relationships improved also (cf Creedon 1973);

he showed a gain of 17 months on a vocabulary intelligence test; and his speech comprehension advanced. During the six months of this study such two-sign combinations as SWIM SCHOOL, TOMORROW PLAY, BOY DRINK, and RED BALL were common. There were also many more complicated sentences composed of three, four, or five signs. Among these were EAT, TURKEY, TOMORROW and NO MOTHER CAR PLAY SCHOOL (when his mother was not coming to pick him up because he was going to play at school). This boy's training in signing continued after the six-month study, and the complexity of his sentences and his vocabulary size continued to increase (the latter to over 200 signs). Recently informal reports of his sentences included many grammatically sophisticated structures: A remarkable instance was WHEN I GET BIG LIKE DADDY AND HAVE WHISKERS I'M GOING TO BE A STREET CLEANER OR A DOCTOR.

Sign language is just one of the several visually-based communication systems which have been tried with speech-limited children. Ratusnik & Ratusnik (1974) provided a brief but interesting account of an autistic seven-year-old's progress in learning visual methods of communication. He first learned to write individual words and to use plastic letters to spell words. Communication in these modes gradually improved. Then a new instructional system was started in which the child formed sentences on a visual "communication board." Questions and directions were given orally, but the child responded by using word-blocks on the communication board. Suppose the child has four blocks which show the four words the, Mother, is, eating; a teacher could then show a picture card related to this set of words and then ask questions which the child could answer by choosing the appropriate words and arranging them to form a sentence. Using this highly structured system, the child made advances in understanding the uses of an increasingly large set of syntactic forms. In addition, a few sentences were generated spontaneously and a broader range of communication opened up between the child and others. This child was still a long way from full mastery of a productive or receptive language system, but the technique facilitated progress for him, and it may have application for other children with severe language-learning difficulties.

Some mute retarded children also have recently acquired components of sign language. They have succeeded in learning a large lexicon of signs and have used these signs in simple combinations (Briggs 1974, Wilson 1974). Insufficient detail has been reported to allow comparison of these children's language acquisition with that of hearing or deaf children. However, it could well be that the pattern of sign acquisition for non-speaking retardates resembles the acquisition of oral language skills in speaking retardates. If so, we would anticipate that the pattern of acquisition in the former would also mirror that of normal children, except for a much reduced pace of development. In addition to being an effective means of communication for the retarded child or autistic child with severe oral language handicaps, sign language or other forms of visual language may facilitate the acquisition of speech or of comprehension of spoken English by these children (Bricker 1972, Miller & Miller 1973, De Villiers & Naughton 1974).

The success of sign language and graphic language training with autistic children and nonverbal retarded children might be attributed to some extent to the special characteristics of a motor coding system. This interpretation is suggested in part by two studies that investigated brain damage and motor coding in adults (Milner 1965, Starr & Phillips 1970). Whereas brain damage made the learning of verbal and visual information impossible, it had little effect upon the learning of motor sequences. Two further studies show successful acquisition of signs or mimic gestures by severely subnormal cerebral palsied children (Levett 1971, Peters 1973) and underline again the conclusion that a visual-motor system for language transmission is a promising avenue of communication for many nonverbal children.

A Theoretical Discussion of Success and Failure in Acquiring a Language

In trying to understand why some children succeed and others fail to master sign language or a spoken and written language, we have already reviewed much evidence that provides useful clues. Here we will try to integrate these previous observations with additional information on factors that may influence language acquisition. We will consider some interesting possibilities of difference between various "learners" of language--deaf, blind, autistic, and retarded children, and sign or symbol-using chimpanzees--in the pace and manner in which they achieve possible cognitive prerequisites to language acquisition, and also in the ways in which early linguistic activity may be combined with other actions.

At first glance it might be assumed that there would be extensive mutual interference between signing about the world and acting upon the world. After all, the young child can simultaneously pull the cat's tail and comment verbally; though a simultaneous comment in sign might be difficult. But when rattles, people, pacifiers, food, thumbs, and other referents available to the young child are considered, it becomes quite evident that, depending upon what the child tries to express at what time, either sign or speech might be at a "disadvantage." On the whole, either sign or speech will be generally available without interference from other ongoing actions of the child. Further, it is clear from Schlesinger & Meadow's observations of hearing children of deaf parents that signing and speaking can develop concurrently without either adversely affecting development in the other mode. The question then is what circumstances and prerequisites are involved when a child succeeds rather than fails to acquire language.

A child certainly might fail to master language or might move toward mastery on a delayed schedule because he or she failed to master a cognitive prerequisite or mastered it only belatedly. But what milestones in cognitive development have been established as prerequisites to language? At present there is no conclusive evidence for any clear cut prerequisite, and we shall argue that there is good reason to doubt some common speculations about prerequisites. Piaget (1951), Sinclair (1971), Bruner (1966), and Brown (1973) have suggested in very general terms that the infant's sensorimotor schemes serve as a foundation for language acquisition. Any adequate theoretical account must move beyond broad generalities, however; and the concept of object permanence has much appeal as a possible prerequisite to symbolic use of words or signs. Yet it can be argued that there is no logical necessity that a general understanding of objects' stability should be prerequisite to the child's use of symbols to represent some aspects of some objects, actions, and events. In addition, recent evidence on blind children and deaf children casts doubt on any crucial role of object permanence as a prerequisite to symbol mastery. For blind children, object permanence mastery may be delayed by as much as two years, compared with sighted children; but the language growth of blind children seems to proceed on a normal timetable (Fraiberg 1968). In contrast, deaf children succeed in object permanence situations at the same ages we would expect for hearing children; but they may show appropriate use of signs even earlier than hearing children begin using words. Witness the deaf child who signed MILK in appropriate fashion--and made sure she got milk and no other food--at the age of 5½ months (Schlesinger & Meadow 1972). From what we have seen and heard of early sign acquisition, it seems that children learning sign often fully master individual signs before they have mastered object permanence. A similar emergence of some signs before object permanence, seems probable for the chimpanzees that are reported to have used appropriately ASL signs such as DRINK and MORE and TICKLE when they were about 3 months old (Gardner & Gardner 1975).

We have just argued that even though object permanence often may precede mastery of words or symbols, the first is not prerequisite to the second. A similar analysis may also be appropriate for the concepts of "hierarchical structure" (Bruner 1966) and "agent, object, location" (Brown 1973). It has been suggested that these concepts are necessarily attained nonverbally before they are expressed in language. Again the evidence available tentatively indicates only a rough empirical correlation in time between nonlinguistic mastery of such concepts and clear linguistic differentiation. The present evidence is too weak to allow specification of what is prerequisite to what. But whether or not specific nonverbal prerequisites exist for these early linguistic concepts, linguistic and nonlinguistic meanings are in most cases very tightly interrelated (Nelson 1974, Strohner & Nelson 1974).

Especially in the symbolic play of the young child, it is clear that linguistic and nonlinguistic action are very freely and flexibly interrelated. The absence of complex symbolic play may help explain the failure of some children to learn to communicate in spontaneous, rule-governed sentences. A similar lack of complex play may explain why most chimpanzees who have learned to use signs have not achieved the fluency even of young deaf children who are acquiring sign language.

Perhaps the ability to use combinations of words (signs) or actions in two senses, the playful and the goal-directed, may be essential to the generation and revision of successively more sophisticated sets of rules for sentence structures.

Other conditions necessary for language. In order to acquire any first language, a child undoubtedly must interact with at least one user of the language. We assume that the child's "model" for the language must fulfill three conditions: (1) The model must be physically and psychologically available for communication. (2) The model(s) must use a wide range of grammatically appropriate sentences and must do so from the outset of word use until the child has mastered the syntactic system. (3) The model must both initiate conversations with the child and reply sensibly and grammatically to some of the child's own sentences. This last condition would not be met if the child merely listened to or observed the use of language by models on television programs. In one remarkable instance--in which deaf parents wanted their hearing child to learn spoken English but not sign language--the primary source of language available to the child was reported to have been American television (Sachs & Johnson, in press). Neither sign nor speech was used extensively with this child by adults or by other children. Only when the child began interacting regularly with normal, speaking children (at about age 4) did he form any rudimentary sentences. Even then, progress toward adult speech remained very slow. Usually, of course, a fluent model (adult or child) is available and interacts extensively with a child, using many grammatical sentences that are varied in form but that generally are less complex and shorter than the sentences that adults use when conversing with each other (cf Phillips 1973).

In addition to the general characteristics of an adequate model, it seems likely that particular kinds of replies and examples may be required if the child is to succeed in mastering syntax. However, for the moment we can just briefly sketch some first steps toward a full analysis of the role of child-adult interaction patterns. The available positive evidence comes from two studies (Nelson, Carskaddon, & Bonvillian 1973, and Nelson 1975) in which adult English speakers used selected kinds of replies to normal 2 $^1/_2$ to 3-year-olds. In each study, children interacted individually with an adult who used the following strategy: Reply to a child's sentence with a sentence which keeps the same basic meaning but expresses this meaning in a new sentence structure. The reasoning was that the child would compare the successive sentences and notice new aspects of sentence structure. Advances in syntax were made by children in both studies, and the second study provides the only evidence we have seen that specific syntactic forms (e.g. tag questions) can be induced by specific kinds of adult-child interaction. Extensions of research along these lines may eventually identify the patterns of interaction necessary for syntax acquisition in speech or in sign. Efficient educational intervention programs may then become feasible for some children who have experienced little success in mastering syntax but who lack none of the motor, cognitive, or perceptual abilities needed for language acquisition.

Even though a child may have deficiencies that hinder language acquisition, appropriate "detours" around these difficulties may make language acquisition possible. Consider deficiencies in the following areas: perception, recognition, and recall of speech sequences; programming or executing a series of articulatory movements; and precise motor movements that are not visually guided. Any of these deficiencies would be severe handicaps to the acquisition of spoken language. But a child might have any or all these deficiencies, and still possess all the cognitive capacities necessary for fully comprehending and producing meaningful grammatical sentences in a medium other than speech. If so, such a child might be able to "detour" past these deficiencies if sign language or some form of written language were the medium of communication between the child and an appropriate adult user of the language. Detours of this general kind may have been involved in the recent success of many autistic children in acquiring aspects of sign language (e.g. those described in Bonvillian & Nelson 1976, and Creedon 1973). The studies mentioned here will, it is hoped, spur a broader search for ways to bypass deficiencies that block certain routes to language mastery while leaving other routes open.

The processing and use of English by the deaf. One of the most dramatic indicators that the deaf usually deal poorly with English is this fact: The reading performance of most deaf 16-year-olds is at least five years below grade level (Bornstein & Roy 1973). For many individuals there is more than just a developmental lag --they commonly reach a plateau at a low level of reading skill that will continue throughout adulthood (Reich & Reich 1974). In comparison with hearing persons, the deaf typically show marked developmental lags and low eventual plateaus not only in reading skills but also in written English skills, English vocabulary size, and level of educational achievement (Bonvillian, Charrow, & Nelson 1973).

Patterns of English usage. Nearly all comparisons of deaf and hearing persons' English usage have revealed significant differences between the two groups. In patterns of word association the groups overlap only slightly. Furthermore deaf children do not show the same systematic changes in word-to-word association patterns over time as those reported for hearing children (Jacobson 1968). However, Bonvillian & Charrow (1972) argue that developmental changes in deaf children's sign-to-sign associations would parallel the developmental shifts in the word associations of hearing children. This prediction was supported in a recent experiment by Tweney & Hoemann (1973).

Studies of recall and recognition of English sentences demonstrate that deaf students, in marked contrast to hearing controls, are not assisted by the grammatical constraints provided by word order or phrase structure (e.g. Odom & Blanton 1967, Fremer 1971). These differences suggest that the deaf and the hearing are using different rules or strategies in processing English sentences. Work on reading comprehension of the deaf provides additional backing for this conclusion (Odom & Blanton 1970). A related finding from this work is that deaf students show lower comprehension for standard English sentences than for sentences designed to approximate the syntax of American Sign Language.

A final indication that deaf children show less sensitivity than hearing children to the properties of English is seen when the groups are matched on reading achievement scores. Even when this matching is done, the hearing children demonstrate higher skills on tests of semantics and syntax (of English) (Moores 1970).

Why should deaf students, even after extended instruction in the use of English, show such marked deviance from hearing students in sensitivity to grammatical structure and in the mastery of reading and writing? At least part of the answer may be in the role which sign language plays for many deaf children and adults in the coding and learning of English. This is our next topic, together with a more general discussion of coding processes.

Multiple codes and their combinations. How the deaf student codes information has been the central question of many recent investigations. In these studies, analyses have been made of the different coding and retrieval strategies which deaf students use with visually presented letters, words, and sentences. It is now clear that there are at least five codes which the deaf may use: speech based, fingerspelling based, shape based, visual imagery based, and coding in terms of signs. In addition it is clear that combinations of these codes and further elaborated coding and organization also occur. Variables that affect which codes are used include the age of onset of the child's hearing loss, the degree of the loss, educational techniques, experimental tasks, and the language environment of the child's home or residential institution.

Coding letter sequences. In recalling visually presented sequences of letters, deaf and hearing subjects usually exhibit widely different response patterns. Deaf children and adults, especially if they have profound hearing loss and only limited speech skills, are apt to confuse letters which are similar in visual appearance or similar in terms of their fingerspelling equivalents. In contrast, hearing subjects or deaf subjects who with available speech skills code letters in terms of their phonological (or articulatory) characteristics should recall well the letter sequences which are dissimilar phonologically, and phonologically similar sequences should lead to confusions for them and therefore to more frequent error in recall. Conrad (1973) found that this expectation was confirmed for hearing adults and for deaf college students with relatively limited degrees of hearing loss. For deaf college students with relatively more severe hearing loss, errors in recall were equally frequent whether or not the letter names were phonologically similar. Wallace (1972) also compared deaf students with hearing controls on recall of visually presented letter sequences. The deaf students made predominant use of visual coding while hearing students relied on articulatory coding. Wallace (1972) further reported that orally trained deaf subjects used some articulatory coding, but that manually trained subjects appeared to use a dactylic or fingerspelling code along with visual shape cues. Similar conclusions fit data obtained by Locke & Locke (1971).

Despite the evidence of differential code use by deaf subjects with differing skills and backgrounds, much remains to be clarified. As yet no studies have firmly demonstrated that a deaf subject who initially produces a pattern of errors indicative of a certain kind of coding (e.g. fingerspelling) will no longer show this pattern of errors if such coding is selectively blocked or if the subject is instructed to use a different means of coding. And in most research to date, the levels of speech, signing, and fingerspelling skills of the deaf subjects are not measured in detail independently of the recall tasks used to infer the subjects' coding strategies. Clearly, for both theoretical and educational reasons, it will be important to distinguish in future research between unavailable coding skills and coding skills which are available but unused.

Coding words. Two coding strategies, sign language and visual imagery, appear to play especially important roles in deaf students' word processing. However, the relative importance of these two factors in word recall by deaf students is not yet well described either in general terms or in terms of the variations from student to student and from task to task.

Craig (1973) proposed that the deaf store verbal information almost exclusively in the form of visual imagery. A number of previous studies with hearing subjects had shown that words with easily imaged meanings (e.g. concrete nouns) were more easily learned or recalled than words that were difficult to image (e.g. abstract nouns). The deaf subjects in Craig's experiment exhibited greater retention of high imagery than of low imagery words, but the relative difference in overall retention for the deaf was comparable to that of normally hearing subjects. This result contradicted Craig's expectation that the deaf students would have particular difficulty in recalling words hard to image.

In addition to visual imagery, many deaf students are likely to use other codes, especially sign language or fingerspelling. With this possiblilty in mind, the two factors of ease of expression in sign language (cf Odom, Blanton, & McIntyre 1970) and of rated visual imagery were systematically varied in experiments by Conlin and Paivio (1975) and Bonvillian (1974). In both studies, deaf students recalled words with high imagery values and words with sign language equivalents significantly more often than words which were neither easily signed nor imaged. Conlin and Paivio found that a high imagery value for a word had a greater facilitating effect on paired-associate recall than a word's signability. In contrast, Bonvillian found that the dimension of signability had the more facilitative effect on free recall of words. In a second experiment, Bonvillian presented highly signable words and instructed half the deaf subjects to form visual images of the experimental words. The remaining subjects rehearsed the sign equivalents for the words. Those subjects instructed to use sign language recalled more low imagery signable words than those subjects instructed to form visual images. This result suggests that when deaf students use a code for words that are not well-suited for that code, then performance may suffer. However, switching to another code allows excellent recall of the same words (cf Conrad 1971).

The work of Klima and Bellugi (1974) also adds to our picture of word and sign coding processes in the deaf. The investigators examined confusion errors made in the recall of individual signs by deaf persons who know American Sign Language but who indicated recall by writing English word equivalents. Their results suggest that the deaf subjects were coding in terms of sign parameters and decoding into English words at the time of recall.

Coding sentences. The literature reviewed above regarding deaf students' coding of English letters and English words establishes that, among deaf students, differences in coding can be related, at least roughly, to relative skills in sign, fingerspelling, and speech, and also to degree of hearing loss. What then can be expected for the processing of English sentences? In the case of a sentence, each word can be coded in terms of sign, speech, fingerspelling, shape, or visual imagery. But in addition, the grammatical structure of the sentence must also be represented. On this level also it is clear that English is processed in contrasting ways by hearing students and deaf students.

"Deafisms" are grammatical errors in written language that rarely occur among hearing students but commonly among deaf students. Charrow (1974) suggested that there may be enough commonalty among deaf adolescents' English errors to justify the existence of a "Deaf English" non-standard dialect or of a regular pidginization of English. In an experiment based on this idea, students were tested on recall of sentences in the hypothesized "Deaf English" and of corresponding standard English sentences. Hearing subjects had more difficulty in recalling "Deaf English" sentences than in recalling standard English sentences, but deaf subjects found the former as easy to recall as the latter. In addition, it appeared that the sentences were processed in different ways by the deaf and the hearing children, since they committed different kinds of errors. Charrow proposes that whereas hearing persons rely on obligatory grammatical rules of English, the deaf have inconsistent or variable rules for certain English constructions.

One explanation for certain difficulties that some deaf students encounter in English reading and writing tasks may be that they have learned English as a second or foreign language. Charrow and Fletcher (1974) administered the Test of English as a Foreign Language (a test designed to identify special difficulties of second language learners) to two groups of deaf students with some skills in English: One group contained children of deaf parents who had acquired American Sign Language in infancy; the other contained deaf children of hearing parents who had learned to sign from peers and teachers after age six. In general, the performance of a large comparison sample of foreign students more closely resembled the performance by deaf students with deaf parents than it did the performance of deaf students with hearing parents. Charrow and Fletcher conclude that for deaf children who acquire sign language in infancy many aspects of English are learned as aspects of a second language. This study, like numerous previous studies, also demonstrates that overall English skills were higher for deaf children of deaf parents than for deaf children of hearing parents. In sum, we might conclude from this study and related work that: (1) In most instances, a deaf child who learns sign language at an early age--compared with a child who does not--will more easily master English skills. (2) Special patterns of errors and special ways of coding may be involved when children learn English after learning sign language. (3) It may be necessary to change current instructional programs in order to teach these children English more effectively.

Cognitive abilities. The proposition that deaf persons possess cognitive abilities comparable to those of most hearing persons rests upon a broad pattern of recent evidence. A differentiated analysis of cognitive abilities is provided by Furth's reviews (1964, 1971). In each of the following areas, the deaf and the hearing show similar cognitive processing abilities: perception, memory, rule learning, and a series of problems related to concrete and formal operational thinking--conservation, seriation, transitivity, logical symbols, and propositions (Furth & Youniss 1971). For many deaf students, as compared with hearing students, there were two kinds of differences that indicate somewhat slower mastery of the same concepts. One difference was that in learning logical symbols and propositions, the deaf subjects required more training than did the hearing subjects. A more widespread difference was that concepts or skills were typically attained at a slightly earlier age in the hearing than in the deaf children. In terms of educational factors and more specifically the opportunity of using one's first-learned language (sign or speech) in classroom or study assignments, the deaf have been disadvantaged in ways that could easily account for such differences in the pace of cognitive growth or learning. Regardless of the explanations for the observed temporal lag between the deaf and the hearing in cognitive development, the conclusion stands that most deaf persons demonstrate the same set of cognitive abilities which hearing persons demonstrate. This conclusion is supported also by the finding that both the rate and the pattern of language acquisition are similar for young deaf children who are learning to sign and young hearing children who are learning to speak. The cognitive abilities required for language use are further evidenced by the fact that a few deaf persons, despite enormous practical and educational obstacles, master written language or speech.

The deaf and the hearing may use comparable cognitive abilities in specialized ways, resulting in distinct patterns of performance. This suggestion awaits exploration for the most part, although we have reviewed above some differences in the language coding processes of the deaf and hearing. In one additional study on this topic, deaf subjects performed significantly better than hearing subjects on tests of spatial memory and memory of designs, but performed more poorly on the tests of memory span for visually presented digits (Blair 1957). It is quite likely that an auditory rehearsal strategy facilitated the hearing subjects' performance on the memory span tasks. Finally there is the question in much research as to whether the deaf are distinctive in the sense that they show thought "without language." In fact, there is little good evidence on language-thought relationships in the deaf, as most research on thinking in the deaf is highly ambiguous about the sign language or English skills of the subjects studied (Bonvillian, Charrow, & Nelson 1973). Accordingly, at present even less is known about language-thought relationships in the deaf than in the hearing.

Since deaf children usually possess "normal" cognitive abilities but fail to master many aspects of their school curriculum and especially the culturally crucial skills of reading and writing, the question arises as to how to help the deaf child better to use his cognitive abilities to learn these skills. One approach would be to rely more heavily on sign language in instructional programs for the deaf. This has been urged by many scholars, as well as by former students of schools for the deaf (see Reich & Reich 1974). A related consideration is that in the first six years of life some deaf children have inadequate opportunities to learn any language. Our view is that deaf children's optimal use of their cognitive abilities will occur when two conditions are met: Sign language is learned and used freely during the period between birth and age five; and, instruction in reading, writing, speaking, and lipreading, and any content areas relies upon sign language as an essential component of instruction. Some further thoughts and evidence along these lines are taken up in the next section.

Languages for Education and Research. Deaf children who know and are encouraged to use manual communication generally show equally favorable or more favorable educational outcomes when compared with deaf children whose instruction has come primarily through speech and speechreading. "Manual" subjects, those who had early childhood background in manual communication or who were given instruction using some manual techniques, have shown superiority in comparisons to subjects with oral language backgrounds on a wide range of skills and tests. Such comparisons have included overall academic achievement, psychosocial adjustment, mathematics, reading, written language, responsiblity, and independence (see Bonvillian, Charrow, & Nelson 1973, Mindel & Vernon 1971).

The observation that a child can acquire Sign without any harmful effect (and possibly beneficial effect) on progress in spoken language appears to be true not only for deaf children but also for hearing children (Schlesinger & Meadow 1972). This finding carries some interesting implications. One is that a hearing child who has deaf parents can be expected to acquire the two languages concurrently in the period between birth and age five, sign language for communicating with deaf relatives and friends and speech for communicating with the larger, hearing community. Another implication is that some young hearing children who do not require sign language for communication with parents might nevertheless be given the opportunity for learning to sign. Such children will then have a fluent second language available and valuable for communication with the significant minority of deaf persons in their community.

Another issue in discussion of deaf education has been the efficacy of simultaneous presentation of information in oral and visual modes. Klopping (1972) and Moores, Weiss, & Goodwin (1973) compared deaf children's comprehension of stories or information presented in various modes and mode combinations. The results indicated that the most accurate means of communication involved the simultaneous use of sign or fingerspelling together with sound and speechreading. The single modes tested--written words or voice--and the combinations of modes that excluded signs and fingerspelling were much less powerful techniques. But further research is needed better to assess the contribution of each mode in various mode combinations.

On the level of psychological theory, a number of additional questions arise about the ways in which languages in different modes can be combined with each other and used to aid cognitive performance. From the research on aphasias it is established that many components of language processing can be isolated. An ability to receive or to produce speech, to read, to write, to sign, to fingerspell, or to process Braille --each of these has been isolated to some extent in different individuals who suffered traumatic cerebral injury. This diversity of specific losses indicates that the representation of each mode may be distinctly different at some level. But the additional fact that individuals who are fluent in any two of these modes can translate easily between the two modes would seem to indicate a similarity at least at an abstract level. For some pairs of modes an additional variation is possible--simultaneous reception of two modes (possibly more) or simultaneous production of two modes (possibly more). Thus one can read and speak, or write and speak, simultaneously in one language. But what about combinations of sign language and speech? A definitive analysis of the processing possibilities in this case would tell much about the nature of language, of attention, and of speech and sign. The few informal observations known to us on this topic all suggest that simultaneous sentences in speech and sign are possible only when the sign language used borrows syntactic structure directly from the spoken language; e.g. spoken English in conjunction with signed English is easily accomplished by those who know both well. But American Sign Language, with its own distinctive syntactic system (see above), may be impossible to produce simultaneously with equivalent spoken English sentences. [Unless, of course, there are short, simple sequences in both ASL and English which happen to have the same number and order of parts, i.e. signs and words; see Introduction above.] Full processing (at least in production) of a complex message in two syntactically distinctive languages simultanecusly may well be beyond the capacities of most or all individuals fluent in the two languages. In any event, the ways in which various sorts of simultaneous processing differ from reception-and-translation situations should be fascinating to work out.

When a child has fully mastered a first language before the age of five, the language has always been either a spoken language or a sign language (or in rare instances both concurrently; see Chapter 7above). If one assumes that man is biologically endowed with speech-specific capacities (Chomsky 1965), the cases of sign language acquisition pose a problem. Perhaps then the capacities of man that make language possible are specific to the structures of sign or speech. We doubt it. Rather it seems probable that man, and possibly some other primates, possesses or develops a set of cognitive capacities that make the tasks of learning complex, socially-embedded cognitive systems--including languages--both interesting and surmountable. To be less abstract, it certainly seems possible that the child's first language could be written English or French. For a few deaf persons this is likely to have been the case (after age five), even though firm documentation to this effect is lacking. Our argument also implies that a new tactual or visual or auditory language could be invented, learned by adults, and then acquired by children who interact with the adult language users. To fulfill such a possibility we would argue, there is nothing lacking in the child's cognitive ability.

In part, our interest in the possibility of the young child acquiring linguistic and conceptual systems besides sign and speech rests upon an interest in developmental theory. But practical implications are also involved. If there are clear alternatives to speech or to sign as a first language, then some children with specific difficulties which hinder acquisition of these languages may achieve greater success in the mastery of another language.

In this review, there has been much more discussion of deaf children than of other speech-limited children, primarily because less is known about language and cognition in the latter. Unquestionably, though, many speech-limited children have cognitive deficits much less rarely found in deaf children. Thus we would urge some caution and discrimination in attempted extensions of sign language programs to autistic, retarded, and other speech-limited children. Instead, two strategies seem in order. One is to try multiple approaches, with signing as just one possiblity. Often the cognitive capacities of children become evident only when new approaches are tried, as the few instances of progress in sign acquisition by mute autistic children demonstrate, The other strategy is to try to match technique to the particular cognitive strengths and deficiencies of the child. In some cases sign alone may be a highly logical choice of technique, but for other children completely new techniques (as we have just argued) or combinations of speech, sign, writing, and other techniques may be more suitable. Looking to the future, we will need lucid and specific formulas for choosing languages and techniques for educating language-limited children. But for the moment, what is both shocking and hopeful is that so much "firm knowledge" of five years ago about speech and language has been revised to incorporate new theoretical and educational elements.

Conclusion. Children's language acquisition and use has usually been discussed solely in terms of a child's oral language and its written version. This paper establishes that the many languages of children--sign language, speech, written language, and other possible languages or language-like systems--require investigation if children's cognitive and linguistic processes are to be understood.

Ten years ago few psychologists, linguists, or educators would have predicted that today so much would be known about the sign language of the deaf. But from current evidence four broad conclusions about sign language emerge. It is clear, first, that sign language is a true language, comparable in complexity to oral language. Second, deaf children and hearing children appear to bring the same general cognitive capacities to language acquisition and to the development of cognitive skills. In addition, there are strong parallels between the rates and processes of acquisition for sign language and for speech. However, in the coding and retrieval of written language the differences in language modalities of deaf and hearing children result in strikingly different performance patterns.

It is argued that if a child is to acquire successfully either speech or sign (or any other first language), similar conditions must be satisfied. There are certain to be some cognitive prerequisites for language acquisition, although they remain to be specified. The qualities of interaction with a model that are required for acquisition of any language are beginning to be understood.

Educational issues for the deaf have focused on the place of speech, sign language, and fingerspelling in instruction. Studies of educational outcomes, of information processing in experimental tasks, and of language acquisition, all imply that increased emphasis on sign language would aid the majority of deaf students. Sign language could be acquired by young deaf children before age five and then used as the primary (but not exclusive) medium for interaction in schools. If sign is mastered as a first language, and is accepted by teachers who also know and use it, the next generation of deaf students may well approach levels of reading and writing comparable to those of the hearing.

Methods of educating autistic, retarded, and other speech-limited children are beginning to reflect the recent insights into children's language processes generally, and particularly into the visually transmitted sign languages of the deaf. Sign language acquisition has progressed to complex stages in some autistic and retarded children who have normal hearing but lack speech. As the research continues, there is an excellent chance that full mastery of signing will prove possible for some hearing children who cannot master speech.

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PART THREE

(SIGN) LANGUAGE AND CULTURE

Linguistics when too rigorously interpreted and practiced as a study of verbal codes loses the vigor it had when each language of the New World was studied as part of the culture of its users. The more recent alliance of linguistics with psychological theory and experiment has produced insights, but perhaps because the larger and older discipline has top billing in "psycholinguistics," it also opens a never ending search to explain mind-and-language. The reappearance, however, of the anthropological spirit of Boas and Sapir in the form of sociolinguistics unites the study of language not just with the people who use it but also with their institutions, belief and value systems, and special circumstances.

In Chapter 12 Harry Markowicz examines this bicultural bilingual situation. Deaf people have to "live in the hearing world," as educators of the deaf are fond of saying without a thought about how it is to be done. Deaf people in fact do not have to or choose to and often are not able to use all the hearing world's tacit assumptions, including unquestioned reliance on hearing and speaking to form life patterns. Instead, most deaf people live in contact with others like themselves, forming one of the many subcultures within each general culture—but one that is special because its signed unspoken language helps to shape it.

Chapter 13 takes us deep (or rather way up) within the Deaf world. The 33 subjects of this network study are top leaders—though they are only some of the Deaf elite. Their work puts them into communication with hearing persons to varying degrees, but they all communicate more with one another (and with their deaf families and constituents) than outside the Deaf world. They lead and shape a special world "within" the hearing world; they are much alike in many respects and vary in others; but the one characteristic they all share is use of American Sign Language; and no one who does not use it is admitted to their group.

PART THREE: 12

SOME SOCIOLINGUISTIC CONSIDERATIONS OF AMERICAN SIGN LANGUAGE

Harry Markowicz

Author's note. The sign language situation has changed somewhat in the United States since this was written in 1970. A growing number of linguists are now engaged in ASL research, including deaf linguists who have made major breakthroughs; for instance finding that inflectional systems, not previously recognized, have an important role. Sign language has also gained a greater degree of public acceptance through artistic productions, its exposure on television, and the efforts of deaf people on behalf of their language and culture. In the schools, oralism has largely given way to the total communication philosophy, thereby making room for a variety of signing that retains some English structure or for one of the sign codes invented to teach English to deaf children.

In the mid-eighteenth century, a controversy developed over the instruction of deaf children, pitting against each other the founders of two opposed methods of instruction. In 1775, the Abbé Charles Michel de l'Épée established the first public school for deaf children in Paris. The method of instruction consisted of the language of signs. A German contemporary, Samuel Heinicke, became known as the originator of the oral method, by which deaf children are taught through speech and lipreading. The controversy between the two schools—the manual and the oral—was never resolved and is still today a central issue in the bitter debate between the proponents of each method.

A search through the literature indicates that the debaters, professionals concerned with the education and the welfare of deaf children, have only rarely looked to linguistics for support for their positions. On the other hand, it appears that until very recently, linguists have not shown any interest in the development and use of language by deaf persons. Interest in the modes of communication employed by those who are deaf seems to have arisen following the establishment of the field of psycholinguistics. Recent studies by Blanton (1968), Lenneberg (1967), McNeill (1965) indicate a concern with the language problems of the deaf person and the implications for the education of deaf children. Sometimes the approach is from the point of view of advancing theoretical knowledge of linguistics, and other times from the practical aspect of helping deaf persons overcome a very large handicap.

Sign language communication. Sign language constitutes the most important means of communication for the majority of the deaf population in North America. At the same time the general community and some deaf people themselves consider it inferior to and more primitive than spoken languages. Linguistic studies, whose results indicate that sign language is not fundamentally different from other languages, can contribute to giving it the legitimate status that it deserves and that may be necessary for the welfare of the community to which it belongs. Sign language and its acquisition by deaf or hearing children may have important implications for linguistic theory. However, this paper will not deal with them as much as with describing the status of signs as a language used by a substantial number of deaf people.

Herbert Kohl (1966) writes, "As adults, deaf individuals use sign language exclusively, or a combination of signs and words....This is true regardless of whether the individuals went to college or not, and is also independent of intelligence." While sign language does permit communication with hearing people (Very few non-deaf persons know this language, these usually the children of deaf parents), the facts indicate that sign language is the preferred means of communication within the community of the deaf. Social scientists have observed the existence of a subculture of deaf people:

> Because most deaf persons are happier in association

> with other deaf persons, and because of the concentration which results, there develops a subculture of the deaf within the larger community. This subculture is a direct result of their deafness, a result of the difficulty they have in communicating with the hearing society around them as opposed to the ease with which they interact among themselves. (Boese 1964: 4)

A quotation of the demographer Anders S. Lunde in Stokoe (1978: 22) reveals the extensive use of sign language in the subculture of the U.S. Deaf population:

> Although oral schools emphasize speechreading and speech, the plain fact is that the deaf as a group use the sign language among themselves. According to Best [Deafness & the Deaf in the U.S., 1938], 78.2 percent of the deaf used sign language and only 1% used speech alone.

Concerning language acquisition by the congenitally deaf, Lenneberg writes:

> In America it is not until the child is four or five that intensive language training is begun, and during the first year the training is merely preparatory, that is, readiness for the instruction in articulation, lip reading, and reading and writing. (1967: 320)

Lenneberg is referring to deaf children whose parents are hearing people and who are naturally unfamiliar with the language of signs. Deaf children of deaf parents who communicate manually learn to sign in the same manner as hearing children learn to speak. Their linguistic development seems to parallel that of hearing children, say Stuckless and Birch (1966: 454). Lenneberg continues:

> Thus there can be no doubt that the deaf come in contact with language at an age when other children have fully mastered this skill and when, perhaps, the most important formative period for language establishment is already on the decline. (1967: 321)

Today the proponents of the manual method are waging a battle from the sidelines, or from the underground, because there does not exist in North America a school for deaf children where the children are taught through the medium of sign language. Neither is sign language included as a subject matter in any school (Stokoe 1960: 25f). All deaf children at present are brought up by the oral method, or in a few schools by a modified oral method, which involves the use of fingerspelling. In some schools, after an initial stage in the oral system, children who fail to make satisfactory progress are relegated to the manual department (Getz 1953: 51).

McCay Vernon, like other social scientists, writes about the deaf population as a suppressed minority. He points out that deaf children, like Puerto Rican, Indian, and Black children, "tend to be forced into segregated schools over which they have little control" (1969: 3). He expresses the psychological relation between the deaf child and the language of the community of which he will probably become a member in this way:

> The consequence of the almost exclusive use of "outside" educators has often been teachers and administrators who cannot fathom the life circumstances of their pupils....The National Association of the Deaf has long supported the use of the language of sign and fingerspelling. Yet the child is taught that these modalities, the only ones he can master for purposes of communication with other deaf persons and with his family, are bad. This negative value is transmitted by its being forbidden to him and his family by the school. His teachers rarely know the language and frequently refuse to use it if they do. (1969: 3)

Robert Boese, in a study of the deaf community of Vancouver, British Columbia, found that almost unanimously, the educators favor oralism for every child (1964: 14). Most educators of the deaf in North America seem to hold the same view. Commenting on the state of education for deaf children, Don Campbell, a psychologist, writes:

> Paradoxically, the very teachers who embrace the idea that most profoundly deaf children, can through speech acquisition, learn to relate well in a hearing world, often themselves studiously avoid involvement with the deaf community other than during the school day when they are paid to do so. This is particularly interesting in view of the fact that these teachers might be expected to be among the first to promote true social integration of the deaf. In practice this is usually not the case. (1970: 2).

In many schools the use of signs is discouraged or punished, while in others it is tolerated. Without the benefit of instruction, the vast majority of deaf people acquire sign language and fingerspelling by association with other deaf persons (Furth 1966: 9). Croneberg (1965) points out the difference between a "native" signer and a "non-native" signer. The native signer is typically a deaf or hearing child of deaf parents, or a deaf person who has had extensive contact with sign language users "since early childhood or early youth" (1965: 297). The non-native signers include a few teachers of deaf children and other deaf persons with only limited intercourse with native signers.

Education without a working language. It is revealing to note the results obtained by the schools which claim to be educating deaf children by means of the oral method. A study done by Boatner showed that only about 5% of the deaf students aged 16 or over leaving the 88 schools surveyed in the study, had attained 10th grade or higher (cited in Quigley 1969: 13). In another study, Furth found that

> ...the percentage of deaf pupils who have linguistic competence...reaches a maximum of only 12%, a number which may be somewhat inflated by the presence of pupils in the norming sample who had lost their hearing after the acquisition of language, or who were not profoundly deaf. (1966: 14)

Furth's evaluation was based on reading skills of the pupils. Quigley points out that reading achievement is not a reliable indicator of a deaf child's linguistic competence and suggests that the ability to write in English is a more reliable measure (1969: 13). Commenting on the writing done by the students of Gallaudet College, Stokoe writes:

> When we look at the literally tons of evidence—we have files of students' writing going back to 1954—just one conclusion is to be drawn. If one objective of our profession is to teach the language of his culture to the deaf child, we have failed. Looking only at the top 10th of the products of our teaching of the deaf child, we can hardly see that we have tried. The language patterns of the other 90% hardly bear looking at. (1963: 967)

Furth, among others, suggests that the education of deaf children has not been adequate. He points out that "a four-year old hearing child masters language and so does an adult with an IQ of 40" (1966: 15). Thus, a high intelligence level is not a prerequisite for the acquisition of language, while the majority of deaf children in schools for the deaf do not acquire it as well as do retarded individuals. According to Furth, "The true 'language' of the deaf is the sign language, as one can readily observe" (1966: 15). Blanton agrees and expresses the opinion that signing will continue to serve as the medium of communication in the Deaf community (1968: 166).

The suggestion that sign language is the 'true' language of the deaf is not a recent one. Épée, who is best known as the founder of the manual method for the education of deaf children, wrote:

> La langue naturelle des sourds et muets est la langue des signes: ils n'en ont point d'autre, tant qu'ils ne sont point instruit, et c'est la nature même, et leurs différents besoins, qui les guident dans ce langue. Il importe peu en quelle langue on veuille les instruire: elles leur sont toutes également étrangères, et celle même du pays dans lequel ils sont nés, n'offre pas plus de facilité que toute autre, pour réussir dans cette enterprise. (1776: 12)
>
> [The natural language of the deaf and mute is the language of signs: they have no other, so that they are are not taught it, nature and their own different needs guide them into this language. It matters little in which language one wishes to teach them; whatever it is they are all foreigners to it, and even the language of the very country in which they are born provides no more facility than all the rest for use in teaching them.]

Recorded history indicates that there had been attempts to educate the deaf long before Épée started his school. Pedro Ponce DeLeón, a Spanish monk born in 1520, educated the children of several noble families "by associating objects with the printed word and then introduced speech by associating movements of the vocal organs with the printed characters" (Quigley 1969: 4). [For more recent scholarship on early Spanish teachers of deaf children, see Chaves & Soler (1974, 1975).] Another approach was taken by Juan Martin Pablo Bonet, who also taught the deaf children of several Spanish noblemen. He described his method in a book published in 1620, Simplification of Sounds and the Art of Teaching the Dumb to Speak. Bonet's method, which is similar to the "Rochester Method" employed in some schools in the past and today, consisted of teaching a one-handed manual alphabet, which was associated with the printed letters. Speech was then taught by associating movements of the vocal organs with printed and fingerspelled letters (Quigley 1969: 4). Morkovin (1960) cited in the same work by Quigley reports that this approach is presently in vogue in the Soviet Union, where it is claimed to obtain excellent results in developing speech and speechreading.

In the initial stages of his instruction, Épée made use of a fingerspelling alphabet associated with the printed letters, and he also made some attempts to teach his pupils speech. However, he differed from his predecessors, as is indicated above. He believed that sign language was the natural language of the deaf and that it should be the medium for their instruction.

He set out to expand the sign language then in use by adding what he called les signes méthodiques, which had the effect of creating a one-to-one relationship between grammatical items in the French language and in sign language. He imposed the French grammatical structure on sign language so that deaf people would have access to French language and culture (Stokoe 1978: 5). This elaborate system of methodical signs was seen by Épée as the natural language of the educated deaf person for their thinking processes and for their communication. [He was doubtless shrewd enough to have realized that in everyday use the elaborate system would undergo curtailment and change. Editor's note]

At the same period that Épée was operating his school in Paris, Samuel Heinicke became the proponent of what became known as the oral method. Heinicke adopted a philosophical position derived from Locke, the founder of empiricism (Garnett 1967: 123). Locke rejected the concept of innate ideas and principles; according to him, all knowledge comes from experience, the mind initially being a blank. Thinking takes place in words (sounds) which form part of experience.

Inspired by Locke, Heinicke claimed that thinking is not possible without spoken language, since it is conducted in the mind by means of the sounds which we make when we talk. A person who has not learned to talk, therefore cannot think, at least not in abstract terms; as a consequence of this belief, Heinicke became the proponent of the oral method of educating deaf children. He opposed manual communication as being harmful to the intellectual development of the deaf person. Reading, for someone unable to speak, he relegated to the same position as manual communication, since for such an individual a written text cannot evoke the sounds of the language in his mind. Heinicke wrote, "it is a mistake to believe that the sense of sight, through written speech, can replace the sense of hearing for deaf mutes. Abstract concepts cannot be developed through the aid of writing" (quoted in Garnett 1968: 23). Heinicke represented written communication in the following manner in the exchange of letters between himself and Épée:

> Through sight we obtain always (inner?) impressions of colors, shapes, and surfaces which are then presented as abstracted in our imagination; yet, we must not believe that because words permit themselves to be represented on paper that they therefore can be similarly presented inside ourselves. No, this in no way follows. Written or printed words are like heaps of flies' feet or spiders' legs; they are not forms or figures that can be presented as fixed or abstracted in our imagination; and we are hardly able to represent individual letters to ourselves subjectively with any continuity. (Garnett 1968: 23)

In his criticism of Épée, Heinicke thus claimed that a deaf person unschooled in the oral method cannot remember, beyond a short period of time, the spelling of words or the configuration of signs representing abstract concepts. In a letter to the editor of a Viennese newspaper, Heinicke wrote: "Clear thinking is possible only in spoken language" (Ibid., 47).

It naturally followed for Heinicke that if deaf people are to be able to think abstractly they must be taught to speak and to speechread. He was of course aware that even through speechreading, the deaf do not perceive auditorially the sounds of a conversation. He resolved this problem by suggesting that the sense of taste somehow provides the deaf with the sound data necessary for thinking to take place (Garnett 1967: 126). Although this bizarre suggestion has not been adopted by Heinicke's followers, his method is today the prevailing one. Young deaf children are not taught in sign language, and signs are generally not used by their educators to communicate outside of the classroom with their pupils. The two centuries of debate about which method to utilize in the education of the deaf often seems to lack the advantage of any scientific evidence. Furth points out the basic fallacy in the educational philosophy of our schools for the deaf: "They [the deaf] feel instinctively that without sign language most of them would indeed be unable to communicate anything but the most primitive and obvious needs" (1966: 16). The same view is held by others who have had extensive contact with deaf individuals; Pintner, quoted by Getz, asserts that

> Some deaf children's speech is comprehensible only to their hearing associates, and it is a bitter disappointment later on in life to find that what they have acquired through long years of hard work is useless when they meet a stranger. (1953: 56f)

In the same work, the opinion of J. Keith is similar:

> Speaking from my own observations of lip reading classes, methods, teachers, and students for more than thirty years, I have still to meet a single one of the lip reading students or graduates who could understand ordinary rapidly spoken speech.

And R. T. Brill points out one reason why deaf people form their own subculture:

> Even when they are fairly good speakers and lip-readers, which is true of only a small percentage, there is a difficulty in the means of ordinary communication, and the result is that they will isolate themselves.

The National Association of the Deaf speaks for a large number of deaf adults when it states:

> The many intelligent deaf who are confused and helpless in classes where oral instruction and nothing else is allowed resent the fact that their education is restricted in this way. Through no fault of their own they have been denied all the workable types of communication which should be open to them....Time which

> could have been well invested in acquiring knowledge has been wasted in forcing children to concentrate on the unreliable arts of speech and lip reading.

Don R. Campbell, a psychologist employed by the Western Institute for the Deaf, in Vancouver, writes:

> Not enough thought is given by administrators of most oral programmes to the fact that while many ten year old deaf children are struggling to say simple sentences on the two or three year [old's] language level, they may also be lagging farther and farther behind in their ability to cope socially and emotionally in a hearing world. They may, at the same time, be falling dramatically behind in their intake of general information. (1970: 4)

Explanations. From the point of view of linguistic competence only, leaving aside all matters of psychological and sociological concern, such as the deaf individual's adjustment to his handicap, his educational achievements, his relations with the deaf and hearing communities, his employment potential, etc., one finds it hard to understand why the professionals who deal with the deaf attempt to impose one mode of communication over another. The deaf turn to sign language as their "natural" language in the same way that a hearing individual acquires and uses the language of the community in which he grows up. Commenting on the educators' viewpoint, Furth writes:

> The fixation on the secondary aspect of language, namely speech, in preference to everything else, including linguistic competence, is indeed baffling. This oral preoccupation must strike a neutral observer as irrational. It is like some strange custom or institution which is encouraged within a community although perceived as harmful by an outsider. (1966: 209)

A review of the literature on the education of the deaf and their social and employment problems written by teachers, school administrators, psychologists, and social workers, indicates almost complete denial of the existence of sign language and fingerspelling— the manual means of communication. The whole emphasis of the educators is directed toward the learning of speech and lipreading, generally confusing this activity with the teaching of language. They are also often convinced that they are creating in the deaf the possibility to think. A teacher comments: "These 'wordless' children are at the same time without any adequate thinking process" (Dumitrescu, in Fusfeld 1967: 63). Another teacher explains how she attempts to overcome her pupils' linguistic problems:

> Some have good speech, others try so hard, though we can hardly understand them and there are still many others who have no speech at all. In this case, I emphasize in the child the power of lipreading and the ability to express himself in writing. I try my best to develop in him all the possibilities that will help him in his struggle for existence—his speech, lipreading and writing abilities—for all these put together will help him a great deal in the daily contacts which enrich life. (Alvarez, in Fusfeld 1967: 89)

For this teacher, like so many others who are well-meaning and sincere in their efforts to help deaf children become part of society, there is no awareness that sign language, the language of the Deaf community, can be the means by which deaf children can be educated.

Campbell points out that

> ...several extensive research studies (Meadow 1967, Montgomery 1966, Stevenson 1964, Quigley & Frisina 1961, Quigley 1969, Stuckless & Birch 1966, and Vernon 1969) have shown that children with early manual communication not only are more advanced when they enter school, but maintain this advantage throughout their school age years. (1970: 15)

The results of these studies indicate that in a comparison of them with children who have been brought up orally only, the former generally have a better command of language, not only in manual communication, but also in lipreading, reading, and writing. There was no difference in speech intelligibility between the two groups. In most cases, the early manual group showed better psychological adjustment and higher educational achievements. Stevenson's study found that four times as many students from the early manual group went to college as students from the oral group.

The lack of sensitivity shown by some educators toward deaf children equals their ignorance about the deaf community and their prejudice against sign language. This insensitivity is illustrated by this comment from a teacher quoted above:

> Speech and speechreading may mean nothing at first to a deaf child, just like talking to a newborn baby. But in every way, we have to keep on and be determined to work on it. The time used cannot all be wasted for we even talk to animals and to our pets, which after numerous repetitions, learn to respond to commands, etc. (Alvarez, in Fusfeld 1967: 89)

The view that a deaf child who does not learn to speak and lipread is less than a human being seems to be quite prevalent among educators of deaf children. The following provides another example:

> Not long ago I spoke with the lady director of an oral school. She was telling about her program, disparaging signs as "glorified gestures." Finally she pointed to a little Black girl, hearing aids sprouting from both ears, who was sitting on the floor and staring at us: "Look at her; she's such a well-trained little animal. (Ridgeway 1969: 20)

The view against signing can be best understood as prejudicial in nature, due to the empirically based belief that only speech is language and that thinking is possible only through speech:

> Underlying this general emphasis on verbal learning was the ready association of thinking and language which prevailed in one form or another throughout the history of Western thought and education. The history of the deaf stands out as one exceptionally glaring instance of man's inability to see beyond the confines of his own theoretical assumptions. (Furth 1966: 212)

Furth has investigated extensively the relationship between conceptual and verbal skill. On the basis of his studies he concludes that "The basic ability to conceptualize and reason is seen as largely independent of [spoken] language and mainly subject to the general experience of living" (1963: 482). Thus, while deaf people may have poor vocal language skills, they may have a normal distribution of intellectual abilities.

The educators' prejudice is akin to the ethnocentrism shown by numerous teachers of English who claim that only standard English is correct, while nonstandard dialects are ungrammatical corruptions of the "pure" language. In the process of teaching "correct" English, they make the speakers of nonstandard English feel that their dialect is inferior (Labov 1970). The educator of the deaf claims that the spoken language, English, is superior to the language of the Deaf community. The following statement taken from a report on the education of the deaf made to the Canadian Department of Education and Science in English illustrates that point:

> There was agreement that deaf children signing among themselves out of class, and deaf adults communicating by signs, are both using forms which are ungrammatical and bear little relationship to normal usage.

The Commission, which itself was not familiar with sign language, listened to the testimony of individuals, both deaf and hearing, whose opinions were sought because of their contact with sign language, without considering the fact that they were not qualified to make objective observations about language. A study based on an informant's opinions of his language certainly would not be considered scientific by a linguist. It is hard to comprehend why this is the practice when it comes to sign languages. The claim that sign language forms are "ungrammatical" refers to the fact that sign language has a structure which is different from English, but then so do Chinese, Turkish, and Swahili. It would be ludicrous to call these languages ungrammatical because they are structured superficially unlike English. However, cultural and linguistic chauvinism does exist; the claim that the French language is the most logical and the most precise of all languages is still heard. The Commission's report continues:

> One witness pointed out that when good and fluent signing is used, it is not, in fact, a self-sufficient language but **parasitic** upon well-developed mastery of conventional language. (p. 27)

The relationship between signing and English is a complex problem which will be somewhat illuminated by a proposal made by Stokoe and to be presented later in this paper.

When recognition is given to manual communication, it is usually by the social workers and psychologists who work with deaf adults and are therefore aware of the limitations imposed on the communication with their deaf clients by lipreading, synthetic speech, and writing. Stephen K.

Chough, a deaf social worker, explains deaf people's preference for signing and fingerspelling over other modes of communication: "Just as hearing people prefer spoken communication to written communication, so do almost all deaf people prefer manual communication" (in Fusfeld 1967: 352). Most deaf people acquire sign language and fingerspelling from others in their subculture, although the community at large does not approve of manual communication. Some deaf individuals who have not acquired linguistic competence in English, and who have been prevented from acquiring the ability to communicate by manual means by the emphasis placed on oral communication in their schools, do not share a language with anyone and therefore live in virtual isolation from all human contact. "Because of difficulty in, or in some instances lack of, means of communication there can be nothing for some but a life of deprivation, loneliness and dissatisfaction" (Chough, loc. cit., 350). Another social worker points out the importance to the individual of communication with others:

> An inability to communicate creates barriers to the satisfaction of basic needs. Since the individual's well being depends in large part on his ability to satisfy his own needs harmoniously with the needs of others, the deafened person may experience considerable frustration both from inner emotional sources and from outer, social situations. (Ibid.)

This explains in part why deaf people associate for the most part with other deaf individuals and form a subcommunity in which communication takes place with almost the same facility as in the hearing world.

When it is accepted as a system of communication, sign language is often not considered equal to other natural languages. Chough makes the following statement:

> While the characteristics of the sign language are more colorful, lively, and dramatic than other means of communication, it has some disadvantages, especially those of grammatical disorder, illogical systems, difficult expression of abstract ideas, and linguistic confusion. (p. 351)

This kind of unscientific observation, literally nonsense, is based on comparison with English grammar, English word order, English word classes and forms, and English semantics, instead of treating a sign language as an independent natural language. Bernard M. Tervoort, a native of Holland, who has studied language development of American and Dutch deaf children, provides an example of the kind of research done by those who consider sign language only a manual representation of some spoken language:

> ...until he [Stokoe] definitely proves differently, the author of the present study warrants to set forth the hypothesis that at least among well educated deaf adults English is the communication system used, be it through speech and lipreading only, through fingerspelling or through signs, or through a combination of these. (n.d.: 4)

His implication is that less educated deaf adults use a form of broken or ungrammatical English. Another observation made by Tervoort is that the material he recorded on film for his study on young deaf children contained very few instances of metaphoric, ironic, or humorous usage (1961: 460). It is apparent from the anecdotes he introduces as evidence, that it is beyond his capacity to determine what constitutes metaphor, irony, or humor in a language in which he has less than native ability. [See also Chapter 4 above.] To prove that abstract and idiomatic usage requires special teaching to deaf children Tervoort shows that they must have the expression 'to hold open house' explained to them, otherwise they understand 'to keep one's door open' (1961: 471). By the same token, a French pupil learning English in school would also need an explanation for such an idiomatic expression. However, on the basis of that particular evidence, one would hardly claim that Frenchmen do not employ idiomatic expressions in their own language. It is correct that deaf children must be taught English—a language that is foreign to them; but it does not follow that their own language is therefore impoverished, as Tervoort indicates.

Herbert Kohl, following a non-partisan investigation of the literature on the education of the deaf, concluded that the schools have failed to do what they set out to do; namely to educate deaf children. Like others, he notes that while deaf individuals generally use sign language for their interpersonal communication, none of the methods of education for deaf children involves the use of that mode of communication (1966: 10). Although Kohl is entirely sympathetic to the use of sign language—he believes that it is the missing element in the education of deaf children—he holds certain reservations regarding its status as a full-fledged language. He expresses the view, based on his study of the literature, that:

> ...sign language is limited in scope and expressive power compared to oral language. It is bound to the concrete, and with difficulty rises to abstraction, metaphor, irony, and humor. The various relevant studies seem to imply that this concreteness generalizes to the learning of English, and it is an interesting question as to whether this limitation may be responsible for some of the deaf child's behavior and maturational problems. (Kohl 1966: 18f)

It appears that all such opinions originate from those who either are not familiar with sign language or are linguistically naive and therefore unable to make scientific observations of any language.

Sign language as a language. To date [1970] very little linguistic work has been done on sign language. What is available tends to indicate that it is an independent language, with its own grammatical and semantic structure. It appears to share general linguistic principles with [vocally] articulated languages. Elizabeth McCall, concludes from her study of sign language:

> Results of the analysis show that Sign has a syntactic system that can be systematically described in a generative grammar. Constructions generated from the grammar that was defined in this investigation are structurally different from English in most cases. It is believed that taken as a whole, Sign is grammatically unique from any other language. (1965: 83)

Unlike such observers as Fusfeld, McCall found that sign language "is a true language" with a "sequential grammatically ordered sentence structure: independent of other languages" (1965: 77f). She suggests a hypothesis concerning the relation between sign language and the spoken language of the community at large:

> It is highly probable that the sign language, or languages, are grammatically distinct from any others, although it may be hypothesized that the structure of Sign in any given country shifts somewhat in the direction of the grammar of the native oral language. This question, however, awaits further investigation. (McCall 1965: 78)

Another investigator, Stokoe, has dealt with this matter. His writings include a structural description of the "cheremic" (phonemic) system and the morphocheremics, or morphophonemics, of American Sign Language. In a work published in 1960 [revised in 1978], Sign Language Structure, he describes an orthography he devised for the units of this sign language. In 1965 he and two colleagues published a sign language-English dictionary in which the signs are listed "in the order of the symbols used to write them" (1965: xxiii), using the orthography described in the earlier work.

Stokoe's analysis of sign language structure is based on the Trager and Smith (1951) model of linguistic description. It describes the combination of cheremes into signs (i.e. the morphocheremics of sign language) and to a limited extent the equivalents of morphological and syntactic levels in spoken languages. The actual syntactic structure of sentences had not yet been analyzed, but several nonmanual elements were isolated and assumed to be part of the syntactic patterns in the same way that the suprasegmentals of speech enter into the structural makeup of spoken sentences. Stokoe writes:

> The sign language, as the term is understood in this study, requires only a small, though radical, change in the definition of language given by Trager in his "Paralanguage" (Studies in Linguistics 13, 3): 'It is the cultural system which employs certain of [the visible actions of the face and hands], combines them in recurrent sequences, and arranges these sequences into systematic distribution in relation to each other and in reference to other cultural systems.' (1960: 30 [1978: 25])

The sign, according to Stokoe in this early analysis, corresponds to the morpheme, the smallest meaningful unit in any language;

> The sign morpheme, however, unlike the word, is seen to be not sequentially but simultaneously produced. Analysis of the sign cannot be segmented in time order but must be aspectual. The aspects of the sign which appear to have the same order of priority and importance as the segmental phonemes of speech are the aspects of configuration, position or location, and motion [action]...

> Like consonant and vowel, the aspects position, configuration and action may only be described in terms of contrast to each other. (1960: 40 [1978: 37f])

The three aspects have been called *tab*, *dez*, and *sig* by Stokoe (respectively position, configuration, and action), and he proposed at the same time the terms *chereme* and *allocher* for the concepts corresponding with *phoneme* and *allophone* (1960: 30). Signs are formed by the combination of the three aspects, requiring movements of the hands and arms of the signer. Facial expression and other bodily activity, Stokoe suggests (1960: 40), function like suprasegmentals. In conclusion he states that

> ...the work so far accomplished seems to us to substantiate the claims that the communicative activity of persons using this language is truly linguistic and susceptible of microlinguistic analysis of the most rigorous kind. (1960: 67) [1978: 79]

Croneberg, a deaf colleague on the dictionary project, has also observed that sociolinguistic variations found in spoken languages occur in sign language:

> ASL (American Sign Language) exhibits both horizontal and vertical variations. So far, only obvious and easily recorded vocabulary differences have been observed. (Stokoe, Croneberg, Casterline 1965: 314)

In different geographical areas, different signs are sometimes used to represent the same thing. Or else, in the same area, different signs are used by the young and the older, the Whites and the Blacks. Stokoe suggests that investigations of sign language will eventually require a change in the definition of language so that it will read (with the deletion of the word *vocal* that used to appear before *symbols*): "A language is a system of arbitrary symbols by means of which persons in a culture carry on the total activity of that culture" (1960: 67) [1978: 80].

Stokoe (1970b) has applied the features of *diglossia*, discovered and described by Ferguson (in *Word*, 1959, 15, 325-340), to sign language. Diglossia occurs when the same speakers use two or more varieties of the same language under different conditions. This approach to sign language contributes to linguistic knowledge, since Stokoe shows that in most respects, sign language diglossia occurs in the same fashion as in the languages that Ferguson used in his investigation: Arabic, Modern Greek, Swiss-German, and Haitian Creole. Secondly, but of more importance to the Deaf community, Stokoe's study by showing the similarity of ASL to other languages and mixed language situations could lead to a changed attitude toward sign language and its use by deaf people for their interpersonal communication and for the education of deaf children.

One of the two varieties of sign language used in North America (excluding areas where English is not spoken in the general community) consists of English represented visually by means of signs and fingerspelled words. In diglossia this form is called 'H' and in the deaf community it is referred to as "correct signing" or "(grammatical) sign language," the name "manual English" having also been suggested (Stokoe 1970b: 28). Sign language H is used in more formal occasions such as in church, for lectures, for all forms of written communication, etc. For deaf people who sign, as for the speakers of the other languages Ferguson studied, H is the prestige form. It is considered by the users of both superior to variety L, the conversational language in use for most everyday communication; it is called "signs" or "signing" by deaf persons. The sign for 'conversation' also refers to L (Ibid.). Stokoe points out that diglossia would present no problem for the Deaf community, except for the fact that outsiders—i.e. professional educators—have made deaf people feel that only H is a respectable language, assuming without benefit of any knowledge of linguistic science that L "is no language at all, has no grammar, is but a collection of 'gestures...suggestive of ...ideas'" (1970b: 30). As in the case of the four languages used by Ferguson, sign language L is grammatically simpler than H, in which signs or fingerspelled words are in a one-to-one relation with spoken words, and in which English morphology is represented and its word order followed. Sign L has its own syntax and does not have most grammatical features found in English, such as inflections and subject-verb concord (33f). H and L share most of their vocabularies; H contains "the whole technical and learned vocabulary of English," which does not have any equivalent in L, since the subjects requiring technical vocabulary are discussed only in H (34); although L can and does borrow vocabulary from H when necessary for conversational use.

In diglossia as described by Ferguson, "The sound systems of H and L constitute a single phonological structure ..." (1970b: 36). The "gestemic" (i.e. phonological) systems of H and L in American Sign Language are described by Stokoe as " a single gestemic structure of which the L gestemics is the basic system and the divergent features of H gestemics are either a subsystem or a parasystem....In using H the signer 'refines' his L gestemics" (37). These differences amount to "the substitution of one allocher for another. The cheremic (phonemic) system embraces them both" (37). In another interesting suggestion worth pursuing further, Stokoe considers fingerspelling a subsystem of sign language, which could be accounted for as "a divergent feature of H gestemics" (37-38).

The lack of interest in sign language shown by linguists in the U.S. where the deaf population is now estimated at one third of one million individuals can be attributed at least in part to the behavioristic basis of American structural linguistics.

> The tone of behavioristic theory was set by its founder, Watson, who proposed that what is called thinking may be nothing but subaudible speech. In other words, thinking is just silent [spoken] language. (Furth 1966: 37)

The non-mentalistic approach taken by the linguist Bloomfield also led him to see thinking as identical to language. He called thinking "talking to oneself;" and he explains further how "thinking" develops as a process of socialization:

> As children we talk to ourselves a lot, but under the correction of our elders, we soon learn to supress the sound producing movements and replace them with very slight inaudible ones: we "think in words."(Bloomfield 1933: 28)

Referring to gesture languages such as those used by monks who have taken a vow of silence and by American Indians as an auxiliary language, Bloomfield states: "It seems certain that these gesture languages are merely developments of ordinary gestures and that any and all complicated or not immediately intelligible gestures are based on the conventions of ordinary speech" (1933: 39). He also writes that "deaf and dumb language," like writing, is merely a derivative of language (1933: 144). While this claim holds true for variety H of ASL, the facts indicate that variety L is not derived from spoken language, and that it has its own independent structure and lexicon. The influence of the dominant culture, the hearing community, must also be recognized over the linguistic expression of the Deaf community, particularly on the level of vocabulary. However, Bloomfield does not refer to any empirical evidence that sign language is derived from spoken language; he appears to make this claim on theoretical grounds so as to avoid a contradiction with his assumption that we "think in words."

Sapir, the anthropological linguist, wrote that possession of a language is a universal fact of human nature. In his words:

> One may argue as to whether a particular tribe engages in activities that are worthy of the name of religion or art, but we know of no people that is not possessed of a fully developed language. The lowliest South African Bushman speaks in the forms of a rich symbolic system that is in essence perfectly comparable to the speech of the cultivated Frenchman. (1921: 22)

However, the kind of symbolic system acceptable to Sapir for language and thinking was restricted to that found in speech:

> We shall no doubt conclude that all voluntary communication of ideas, aside from normal speech, is either a transfer, direct or indirect, from the typical symbolism of language as spoken and heard or, at the least, involves the intermediary of truly linguistic symbolism... auditory imagery and the correlated motor imagery leading to articulation are, by whatever devious ways we follow the process, the historic fountain-head of all speech and of all thinking. (1921: 21)

With these a priori conceptions of the nature of linguistic symbolism and of thinking, it is not surprising that Sapir rejects the possibility that gesture languages, including that used by deaf people, possess independent systems suitable for the thinking processes of those who use them. He states that "The intelligibility of these vaguer symbolisms can hardly be due to anything but their automatic and silent translation into the terms of a fuller flow of speech" (Ibid.). Aside from the fact that this statement contradicts the native signer's intutition (communicated to the writer by several native signers both deaf and hearing), the claim does not seem tenable in light of the fact that 88% of deaf adults do not achieve linguistic competence in a spoken language (Furth 1966: 14). Sapir would have us believe that the signer who expresses himself fully and freely in sign language, translates from or into another language in which his level of expression—in speech, lipreading, reading, writing, and fingerspelling—may be less adequate than that of a four year old hearing child. For deaf people Sapir's claim leads to an important implication concerning their education, their employment potential, and their social status in the community of hearing people; viz., that because of their inability to hear and to acquire spoken language, they are forcibly limited in their intellectual capacities.

Sociolinguistics and status.

We have seen earlier how Heinicke developed the oral method for the same reasons; i.e. he felt that unless deaf people learned to speak and lipread, they would have no language and they would be unable to think, or at best they might think in concrete terms only. The concept that articulated words are the necessary medium through which thought can occur is said to be an idea held by the Greek philosophers (DeLand 1968: 8). Although references to deaf persons exist from early times, not much information is given about them. One thing they do indicate, according to DeLand, "they were considered incapable of being educated" (Ibid.). The deaf, with occasional exceptions that were often recorded with exaggerations, were left in ignorance. Methods for the instruction of the deaf began appearing toward the end of the sixteenth century in different parts of Europe. The change in attitude toward the deaf resulting from the awareness that they could be educated to take part in the culture around them was extremely significant. It was no longer thought that "dumbness," in the sense of lack of intellectual capacity, was the necessary correlate of deafness. After almost two hundred years of instruction, the lot of deaf people has been much improved and they have gained a certain degree of acceptance in the society at large. However, Furth points out:

> Our educational and scientific atmosphere does not permit us really to accept deafness.... As stated before, the deaf are now accepted as being possibly equal to the hearing in intelligence, but only insofar as they succeed

> in learning the language of the hearing. Common opinion about the interdependency of language and thinking has hardly changed. (1966: 28)

Just as in the case of other minority groups, North American society is willing to accept the deaf on condition that they accept its values, here represented by its language. Furth points out that "This attitude is constantly nourished by theories of scholars who extol language as the source and medium of civilization and intelligence" (1966: 203). In this regard, Labov, a critic of recent programs for teaching the "culturally disadvantaged," states:

> For many generations, American school teachers have devoted themselves to correcting a small number of nonstandard English rules to their standard equivalents, under the impression that they were teaching logic. This view has been reinforced and given theoretical justification by the claim that nonstandard Negro English lacks the means for the expression of logical thought. (1970: 22)

The similarity between the criticisms levelled at sign language and at nonstandard Black English is striking. Labov points out that

> linguists have endeavored for many years to show that differences in language are matters of social convention established by historical processes which shift continually the social prestige of dialect variants. (1970: 1)

Apparently linguists have not been very successful in establishing this point of view, since the opposite opinion still prevails in our society. The argument for equal status of sign language is more difficult to present than that for nonstandard English, because in one extreme it is an independent language and in the other it can be a visual representation of English—both L and H varieties making use of signs. The prejudice against nonstandard English dialects is caused by "ignorance of basic facts about human language and the people who speak it" (Labov 1970: 34). To make sign language acceptable requires, in addition, overcoming the long-standing assumption concerning the relation of thinking and spoken language. In this respect, structural linguists (Stokoe excepted) have been of no help, because to do so would cause them to contradict their underlying assumption; i.e. that thinking is a silent expression of speech.

Sign language offers two different areas of research to the linguist. The first one involves doing basic investigations on the nature of sign language: linguistic description and analysis. This type of study would add to the store of knowledge of natural languages used by humankind to communicate with one another. It may also contain implications for linguistic theory for which less exotic languages would not provide evidence. At the very least, the existence of languages that make use of visually rather than auditorially perceived symbols would require the redefinition of some basic concepts in the science of linguistics. Of more importance, research on sign language acquisition among children of deaf parents offers possible evidence for the hypothesis advanced by Chomsky and others that there is an innate language capacity in human beings (Chomsky 1965, Lenneberg 1967, McNeill 1966). Their assumption is based on a rationalist approach to linguistic theory, in which language is seen as species-specific and a result of man's unique biological make-up (Lenneberg 1967: 28). The empiricist view, which holds that language is acquired as a result of conditioning of the individual by his environment and his experience (Skinner 1957), may obtain support from the work being done by Allen and Beatrice Gardner with a chimpanzee who is acquiring signs of ASL (Science, 1969, 165, 669-672).

A conference on sign languages, sponsored by the Center for Applied Linguistics, was held on the 5th and 6th of December 1969 (Stokoe 1970a). Its unstructured discussions dealt mainly with problems of definition and classification (Stokoe 1974: 346-371) among nine participants, including two deaf persons in the secretariat of the National Association of the Deaf. This conference reveals a growing interest by linguists and sociolinguists in sign languages.

The second area of interest for the linguist in sign language is directly in the field of applied linguistics. One of the problems requiring attention is how to make sign language acceptable as a mode of communication for deaf adults in the community at large; and of greater importance for the welfare of the Deaf community, to make it acceptable as the medium for the educating of deaf children. In relation to this problem, psycholinguistic investigation of language acquisition will, it is to be hoped, shed some light on how linguistic competence is established in an individual. This knowledge could then be applied to determine ways of educating deaf persons so that ultimately they can achieve true bilingualism: sign language competence for interpersonal communication in the Deaf community, and linguistic competence in English, at least in written English, so that they can also partake of the common culture of the society in which they live.

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PART THREE: 13

AN ELITE GROUP IN DEAF SOCIETY

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Carol Padden

> "Any large society must have an elite group to lead it and manage its affairs.... Small societies can get along without any social stratification at all. Therefore the principal evolutionary trend has been toward increasing power and authority in the elite."
>
> —Driver 1973: 358

Deaf society is no exception to the dictum that "any large society must have an elite group..." Schein (1968) estimates the adult deaf in the Washington, D.C., metropolitan area alone to number between 1,132 and 1,492. Schein and Delk (1974) find the "prevocationally" deaf to number as many as 203 per 100,000 in the nation's population, and they cite Health Examination Surveys (HES) and Health Interview Surveys (HIS), which put the incidence of those who "can hear and understand a few spoken words or who cannot... understand any" at 1,100 (HES), and 1,000 (HIS) per 100,000 (1974: 32). By any measure then, the five hundred thousand to one and one-half million deaf persons in the United States may be seen to constitute a large society.

But more than demographers' numbers are needed to make a society. It has been common practice for authorities concerned with the delivery of education and other services to deaf persons to deny that a Deaf society exists. (For a typology of some of those who reject "the deaf experience," see Nash 1975). These authorities suppose instead that deaf persons form a handicapped minority that needs a special group of hearing professionals to lead it and manage its affairs. In some countries, unfortunately, this self-serving view of the hearing specialist has become a self-fulfilling prophecy, and as a result many deaf persons in those countries have become almost totally dependent. Deaf society in the United States is large enough to wield power and authority through its own elite.

The purpose of this paper is not primarily to substantiate the claims that the deaf population forms a society, a large society, a society with its own elite group. These facts are self-evident, as the original presentation attests—this was one of seven studies composing the Symposium "Culture and Language in the Deaf Community" at the 73rd Annual Meeting of the American Anthropological Association in Mexico City, November 1974. Its purpose instead is to examine the power and authority structure in the Deaf community as it is revealed by the communication network of an elite group, the better to understand some of the characteristics of the group and of the wider society it serves.

There is little difficulty, as a rule, in finding those individuals who lead and manage. What headdresses and white horses do in some societies to distinguish leaders is done in other societies by titles, offices, and positions. But if the elite are easy to identify, they are notoriously hard to study. It is easier indeed to get their permission to investigate hundreds or thousands of their constituents than to probe the structure of the group in authority. Since knowledge is power, any elite group carefully guards the real knowledge of its structure and function.

We present here, therefore, an unusual glimpse of how power and authority are regulated. In part this is possible because two of us bring to the task an accumulation of forty years of participating, observing, and otherwise interacting with or in deaf society. One of us is deaf (70db better-ear loss from birth), has deaf parents, a deaf sibling, and many deaf friends—in short is a member of deaf society. The other of these two has direct professional contact with several members of the elite group that has extended over many years. In part too, the technique developed by the third author and a colleague makes this investigation possible.

KBPAK (Killworth & Bernard 1974) produces a sociogram like picture of a network in any closed group of 40 to 150 persons, but unlike most sociograms, the matrix CAT_{ij} at the base of KBPAK has as its input 100% ranked data of unlimited choice. The distance matrix, which is the input to the program, is manipulated to produce a matrix of minimum distance from any $\underline{i}$ to any j, using as many intermediaries as are required. The number of intermediaries used to achieve this minimum distance is given as the "cognitive category of interaction" between any i-j pair; hence CAT_{ij} (Bernard & Killworth 1973: 145-184). KBPAK output contains information of two kinds: (1) any individual in the group may or may not be in a subgroup; and (2) linkage may be reciprocal, one-way, or nonexistent between any two individuals. [This means that members of a group may be characterized as a clique in the traditional sociometric sense; however, subgroup membership obviously depends on internal perceptual or external ethnographic factors; thus, unlike other similar techniques, CAT_{ij} produces real cliques only as an artifact or consequence of operant interactional or cognitive factors within the larger group.]

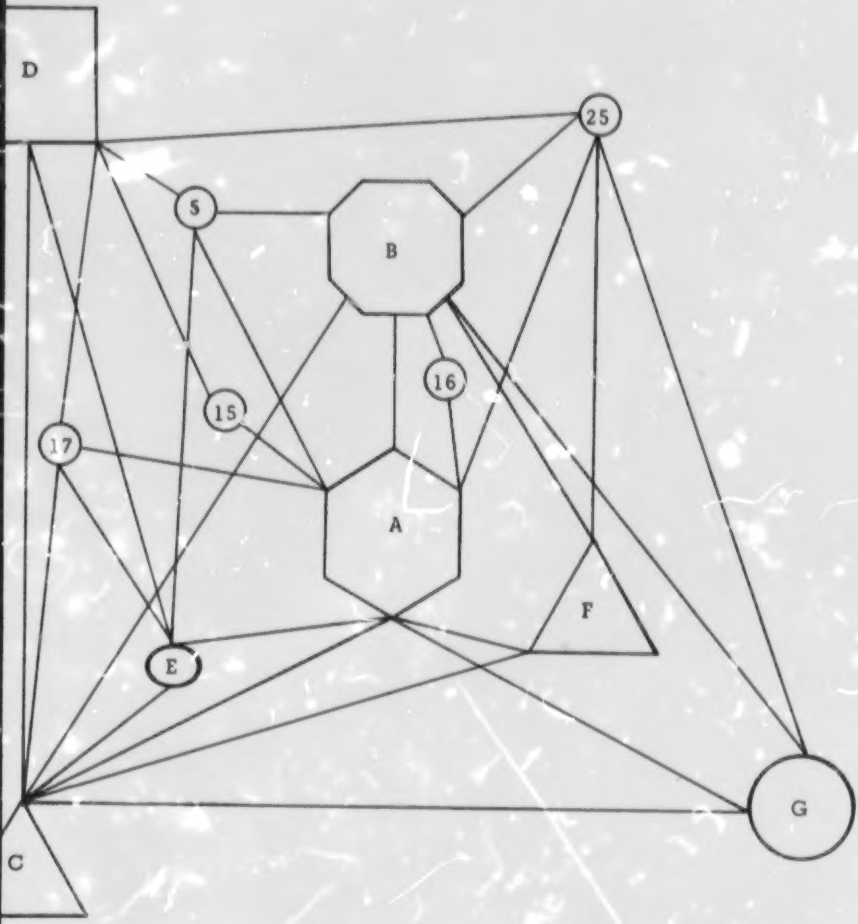
Procedure. Our investigation of the deaf elite group had four steps. First we pooled experience, direct knowledge, and intuition to assemble a list of the likeliest persons for inclusion in a hypothesized elite group, which finally numbered thirty-three. The question of their constituency (i.e. what society or societies they represented and what were their dimensions) were left unanswered. All 33 reside in the capital metropolitan area; all are well known to many of the area's other residents; several are officers of state, national, and international deaf groups of various kinds. While we cannot claim, therefore that these 33 persons are the elite of a particular deaf society that is geographically or otherwise determined, we are sure that the elite group of national deaf society is somewhat larger at least, and that among these 33 are to be found local, national, and international leaders.

Second, a personal interview enabled each person in the 33 to rank the other 32 according to communicative contact. Frequency, length, and importance of communication with the others were lumped in the ranking, as were both professional and social interaction. When this step was completed, we had input data for KBPAK in the form of a 33 X 33 matrix of numbers (one for each person) showing the distance from any i to any j. The third step was computer processing of this data. Finally the output was analyzed by all three of us; linkage and subgrouping shown in the program readout were converted from tables of numbers into several sociograms.

differing in fineness of detail; then the structure of the elite group as shown in the sociograms was related to extensive ethnographic data.

The CAT_{ij} sociograms. The program output shows a network of seven subgroups plus six individuals not contained in the subgroups. Four of the six clearly fit the role of "broker" and stand outside all the subgroups but with links to and from them. Each of the four "brokers" has seven to ten links with members of four or five subgroups. A fifth member of the six has nine links in all, but these are all with just two subgroups. This person is not needed as a broker, because both these subgroups have more than twice as many direct links between them as he provides. This first brief survey of the data accounts for 32 of the whole group of 33, 27 lying in the seven subgroups and 5 outside. The remaining member stands really outside the main group as well. Linked reciprocally with only two others and with a link to but not from two additional others, this person represents our error in compiling the original list in step one. Despite a position that entails regular professional contact with several members of the elite group, this person is not cognitively perceived by its members as one of them.

Subgroups and brokers. We have begun by considering the exceptional instance in the network and will proceed to the more and more typical; i.e. in the opposite way from the CAT_{ij} program, which progressively identifies and removes from the matrix whatever will most reduce the variance. After the non-member or marginal member of the group we find one who appears potentially a member of either of two subgroups, but who stands between them with links to both. From this member we come to several who have the position of broker. Bernard and Killworth (1973) find any broker under strong pressure to be included in a subgroup, and predict that a broker will preserve independent status only when there is a structurally well-defined liaison function to be performed in the communication of the group. Details of the brokers' positions in this network will come to light when subgroup characteristics are examined; here it is possible to predict that two of the brokers, '5' and '25' in


D
25
5
B
16
15
17
A
F
E
G
C

e 1. The seven subgroups (A-G) of the 33-member elite group, the brokers, and other individual members, with lines to show CAT_{ij} linkage.

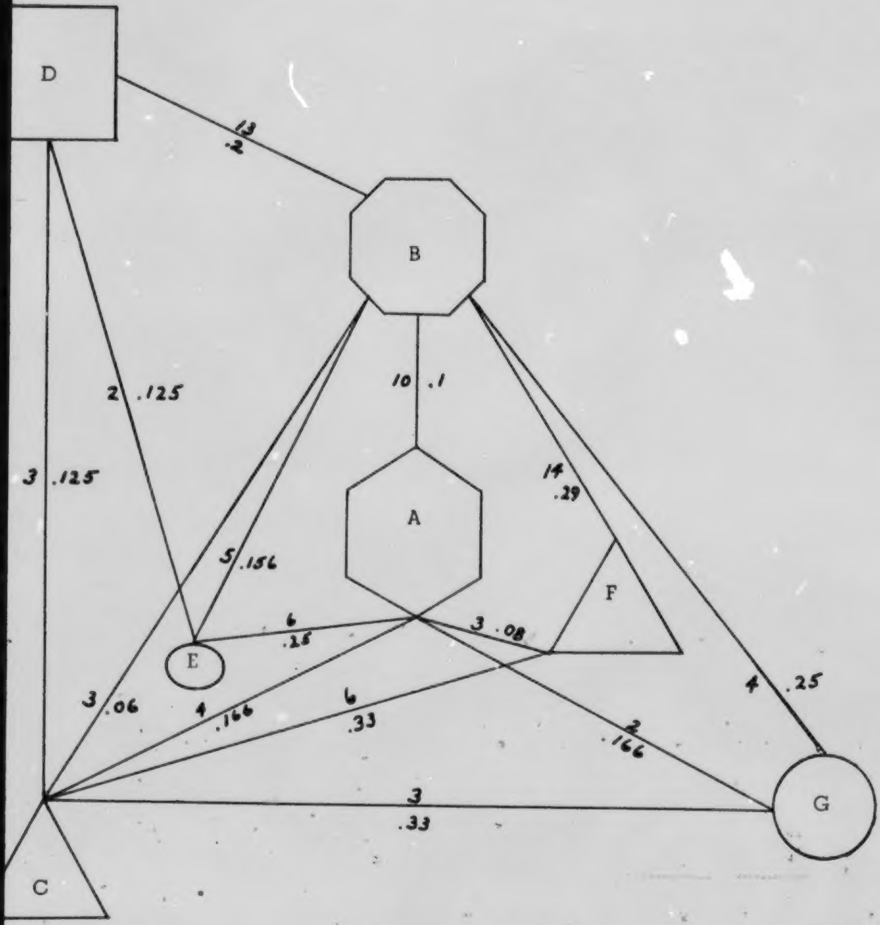
Figure 1, are likely to remain brokers. The nature of their professional positions in large and important associations of American Deaf society makes their access to many or all of the subgroups more rewarding to them and to others than would their closer ties to any one subgroup. One of the other two brokers, '15', presents no clear indication of a coming change in status, but '17' may be headed for identification either with subgroup A or subgroup D, or for an even stronger liaison position between them.

Subgroup structure. A subgroup as defined by the KBPAK program may consist of members maximally linked or with relatively many links or with few or no links between its members, but if the last, the members will have demonstrably similar relations to the rest of the network. In our elite group of 33, the seventh subgroup (G in the figures) has only one member. This one has links with other subgroups and so functions in the network much as do individual brokers. Subgroups F, E, D, C, B, and A have, respectively, three, two, four, three, eight, and six members.

Figure 1 shows all seven subgroups, the brokers, and lines representing CAT_{ij} linkage. It provides so much detail, however, that the structure of the network cannot be clearly discerned. In Figure 2 the brokers have been removed and the linkage between subgroups is shown both as number of links and as a decimal fraction of the maximum possible linkage. The structure is still obscure. Actual linkage has a reality not found in percentages; therefore, in Figure 3, only the first six subgroups are shown and the subgroups are joined by lines only if the actual number of links is four or more.

A structural pattern begins to emerge in Figure 3. E has links with A and also with B, and A and B have links with each other in a pattern suggesting transitivity. More striking is the asymmetry: for subgroups A, C, E, and F, the main route to D or from it is through B, or else through the brokers shown on the left side in Figure 1. The pattern is not absolute. Not shown in Figure 3 are two direct links between C and D and three between E and D. Even so, C has more linkage with B through A and F than directly to B.

This asymmetrically branching pattern is shown still more clearly in Figure 4. Although only four of the seven subgroups are shown in Fig. 4, 22 of the 33 members are included,


D
13
.2
B
10 .1
2 .125
3 .125
14
.29
A
5 .156
F
6
.25
3 .08
E
4 .25
3 .06
4 .166
6
.33
2
.166
G
3
.33
C

gure 2. The subgroups only (28 of the 33), with numbers of direct links and decimal fraction of maximum linkage possible shown.

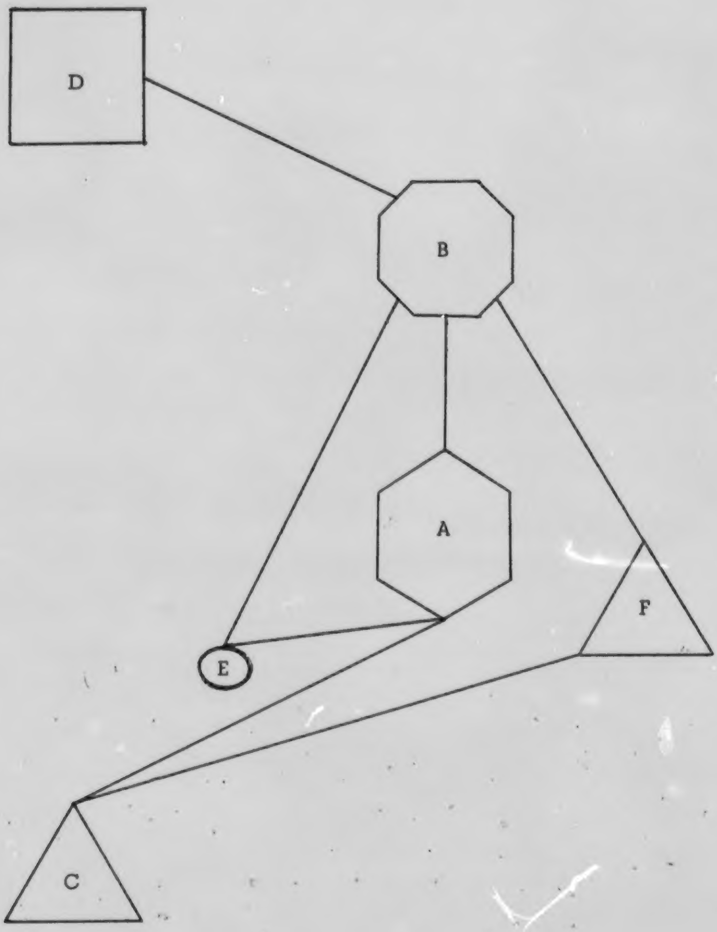


Figure 3. Six of the seven subgroups of the network, containing 78.78% o
population, with lines showing four or more links.

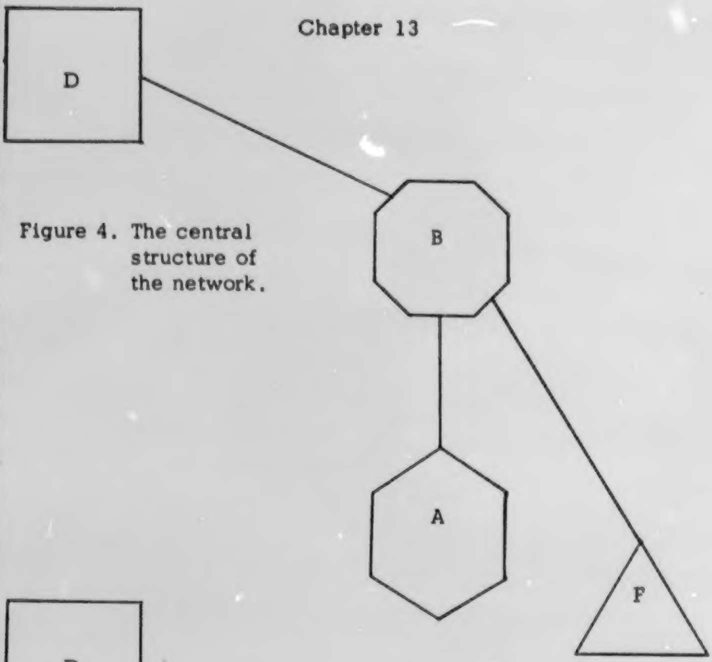


Figure 4. The central structure of the network.

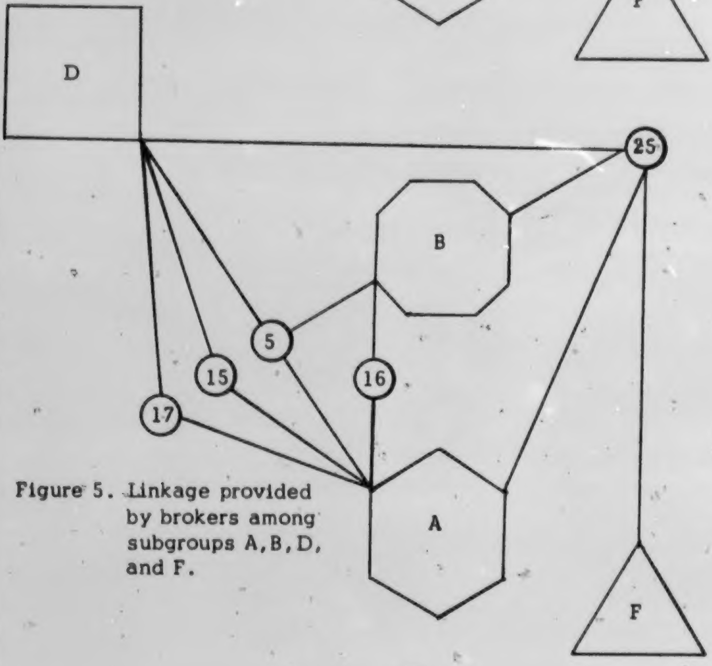

D
25
B
5
15
16
17
A
F

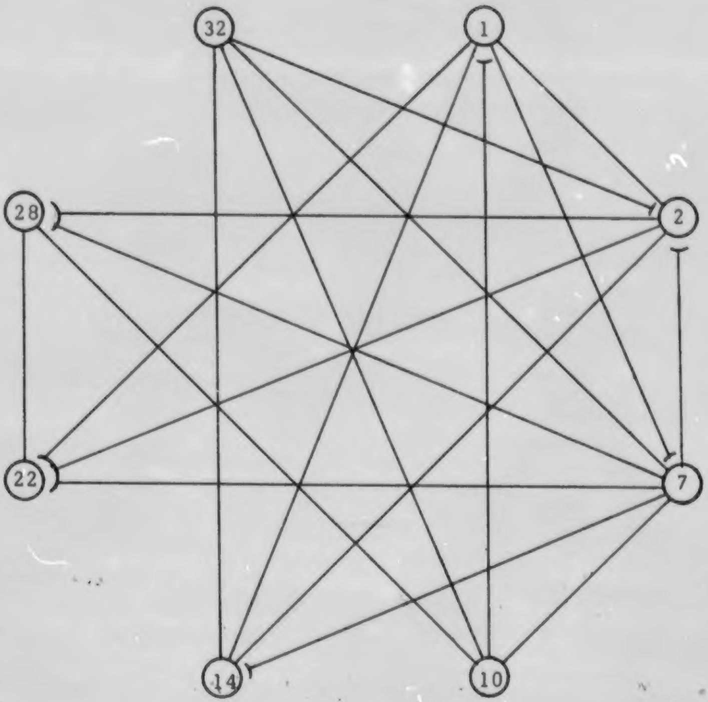
Figure 5. Linkage provided by brokers among subgroups A, B, D, and F.

and 37 of the 62 links drawn in Figure 3 are represented in Figure 4. The centrality of B is now quite clear: the four member subgroup D stands alone on one side of B, while A and F are opposite (and in fact as Figure 2 shows, C, E, and G are also opposite to D).

In Figure 5 the brokers have been added to the picture again, making still stronger the visual impression that in the four subgroups A, B, D, and F we have the central frame of the network. Because the network shows the lines of communication—its frequency and amount cognitively determined by all of its members—its structure can also be taken as representative of the lines of power and authority. A fuller interpretation of the sociogram, however, calls for ethnographic description.

Inside the subgroups. We have been looking at a series of graphs progressively generalizing the structure of a communication network. We will now anticipate some of the conclusions reached through ethnography of the group and sketch here in colloquial language the general power structure in this deaf elite group: Subgroup B, the largest, is the center of action, linked with more subgroups than is any other, and drawing power directly from D. Subgroup D is the small but powerful source of authority. Subgroup A might be termed the "junior executives"—the name being justified both by the actual ages of the subgroup members and by A's linkage with D, not directly but through B, and four or five brokers. Subgroup F, even more strongly linked with B than is A, provides one of the main liaisons of B and the rest of the elite 33 with much larger associations of deaf persons. Subgroup E has major linkage with A and B and minor linkage with D and C. Subgroup C also has links with D, but like E, it lies off the main lines of power—D-B-A and D-B-F. Subgroup G, actually a single person, also achieves its position through linkage with B and with A.

The active center of the network, subgroup B, has the internal linkage shown in Figure 6. Within B, members 1, 2, and 14 form a clique in the traditional sense, as also do persons 7, 10, and 32; both these triads are bound together by reciprocal links. Several of these six members also have reciprocal linkage with others in subgroup B as well as with persons outside it. Thus B, like the whole group, is a network with


32
1
28
2
22
7
14
10

igure 6. Linkage within the eight-member subgroup B.

Legend: Mutual linkage between members -- ○—○

Link from r. member to l. member -- ○—(○

all four kinds of linkage: mutual (e.g. 1↔2); to or toward (e.g. 2→7); from (e.g. 10←1); and zero or no linkage (e.g. 1 / 32).

At the opposite extreme from the maximally linked triads in B are members 22 and 28, mutually linked to each other; but though each has links to three of the other members of B (i.e. claims to know and communicate with them), only one of these reciprocates; consequently 28 has only one link from a member of the subgroup other than 22, and 22 is linked into B only through 28—a tenuous connection. Nevertheless, the CAT_{ij} program shows that subgroup B has eight members (Figure 6, above). It is the ethnographer's task to discover what these eight have in common and what sets them and their perception of the group off from the rest.

Linking factors. Three forces appear to bind members into the subgroupings CAT_{ij} produces from the data: the members' ages, their occupations, and their college experiences. The mode in B is "fiftyish"—actual ages are 57, 55, 52, 52, 52, 48, 46, 40. In subgroup A, the mode is mid-forties (53, 50, 45, 44, 40, 37). In D the ages of all four members are contained in four years—61-64. In C, E, and F, the ages average 41.3, 40.5, and 42.3 respectively. Six members of B hold positions in Gallaudet College as deans and department heads; the other two are government printers—interestingly, several of the older members of the whole elite group have worked as printers and some have been active in the printing trades unions before having full time academic positions.

Gallaudet College, employer of 21 of the 33 members of the whole group, was founded in 1864 and is still the only four-year liberal arts college exclusively for deaf students. (It now includes also programs in which a deaf person may earn an advanced degree.) The college therefore has a much more pervasive influence than that simply of employer on the communication network, the power structure, and the ordering of affairs in the Deaf community. Not surprisingly 29 of the 33 members of the group have earned degrees at Gallaudet and two have bachelor's degrees from other colleges or universities.

The importance of college in the lives of all deaf persons is unusual as well. Schein and Bushnaq (1962) found that there was one deaf person in college for 68 in school (the year 1960) but in the whole population, comparing school and college numbers, the ratio is 1 to 11 instead of 1 to 68. The denominator of the latter fraction was certainly much larger in the 1930's and 1940's, when half the present group of 33 were in college. The number of those who having entered college continue to a degree is of course considerably smaller. Add to this the fact that 23 of the 33 have master's degrees, and 11 have earned doctorates or have all but the dissertation completed, and it becomes strikingly clear that a high educational level is a key characteristic of the deaf elite.

But this is not the whole account of how Gallaudet College affects the structure of this elite. What happens is that age and the associations afforded by this unique institution work together to produce strong bonds indeed. Half of the members of subgroup A have been interacting with each other for more than 20 years; six of the eight members in B have been in close contact for more than 30 years; and all four members of subgroup D have known each other for at least 45 years. A few in each subgroup, as classmates, have shared both sides of the initiatory rites of hazing and all the rest of class rivalry and other college activities. Many have been in close touch with each other since sharing one to five years (Gallaudet students often begin with a preparatory year before the freshman year) in college. These then are more than cognitively and communicatively linked subgroups of deaf individuals; they are "cohorts" proceeding through life in a social formation that resembles the age-sets described in classic anthropological studies.

Subgroup A (Figure 7), like B, has two maximally linked triads (or cliques): 6-11-31, and 6-23-31; it misses by one link (23's link to 11 is not reciprocated) a four-way saturation of linkage. The members' ages show a wider spread (37 for the youngest to 53) than in B, and although three of the six share overlapping college years, one member of A did not attend Gallaudet. Their years of graduation range from '51 to '76. In other respects A is a homogeneous group: all its members have the same employer, and four of the six work in offices near each other. Yet the remaining two, about as far removed when at work from the others as the campus layout permits, are not on the edges but in the center of this maximally linked subgroup network. There is more to linkage than the three forces so far examined.

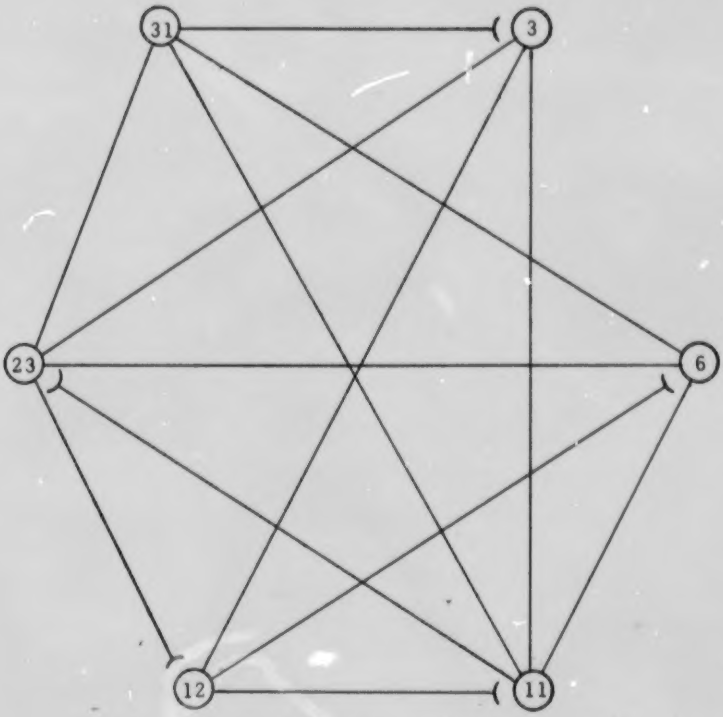


Figure 7. Linkage within the six-member subgroup A.

Legend: Mutual linkage between members -- ○——○

Link from r. member to l. member -- ○—(○

Subgroups C and F (Figure 8) both consist of a triad, with two members mutually linked but the third with no row-one CAT_{ij} linkage to the pair. In C, the ages might suggest such a structure (47, 42, 35); but in fact the linked pair are the eldest and the youngest members. Professional positions rather than age seem to explain the subgroup relationship in C. All three members of C have other than Gallaudet College employment, and their duties and contacts would seem to provide them with a similar cognitive perception of the rest of the whole group. In structure F is quite like C; the ages are 53, 44, and 30, with linkage reciprocal between the eldest and youngest; and the professional positions they hold and the nature of their work seem to be major factors in their relationship.

The members of subgroup E number only two; they have mutual linkage, work in close proximity, and are professionally in similar relationship to the activities of subgroups A and B.

Members of subgroup D (Figure 9) have the closest years of birth and college graduation (1910-1913 and 1932-1935). Three of the four members hold positions in the Federal government, with positions like Chief of Branch, Head of Division, Senior Consultant; the fourth is a department chairman in Gallaudet College. The positions of the first three with a powerful government department literally connect deaf society through this entire elite network with the power that federal funds, grants, programs, policies, projects, and agencies can provide. The location, activity, and organizational expertise of the remaining member supply direct linkage to other parts of the network. This member has mutual linkage with a broker and a member of B, has links to three other members of B and to a second broker, and has links from members of C and B—all this of course in addition to his internal linkage with the others in subgroup D.

To recapitulate what the graphs show: D is at the source of power. B directly wields much of that power, has 13 direct links with D and 6 more through brokers, controls important deanships and chairmanships within Gallaudet College, which since 1864 has both served and been served by the deaf elite. Subgroup A derives power from D through B and through brokers, and controls top positions in the newer precollege programs of Gallaudet College; viz. the Model

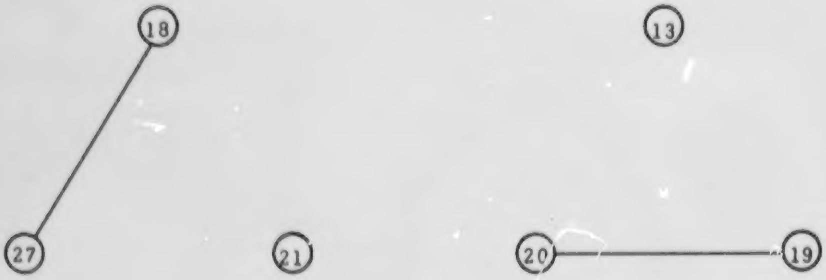

18
13
27
21
20
19

Figure 8. Linkage within subgroups C (on left) and F (on right).

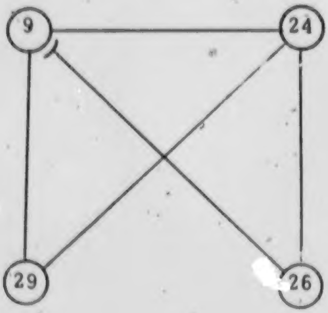


Figure 9. Linkage within subgroup D.

Secondary School for the Deaf and Kendall Demonstration Elementary School. The other subgroups and the brokers connect closely with A and B. They also extend the power of the elite group to outside networks; e.g. to such formal groups as the National Association of the Deaf and the National Fraternal Society of the Deaf. But this outward connection of the whole elite is noteworthy; only four of the 33 list fewer than four such organizational affiliations.

The list of organizations tied into this network and the power it wields strengthens the demographers' contention that Deaf society is large and moreover already well organized. Some organizations the 33 belong to or direct:

American Athletic Association of the Deaf
Alexander Graham Bell Association
Capital City Association of the Deaf
Comité International des Sports Silencieux (Familiarly, "The Deaf Olympics")
Conference of Executives of American Schools for the Deaf
Convention of American Instructors of the Deaf
Episcopal Conference of the Deaf (National)
Gallaudet College Alumni Association
International Association of Parents of Deaf Children
International Catholic Deaf Association
Maryland Association of the Deaf
Minnesota Association of the Deaf
National Association of the Deaf
National Congress of Jewish Deaf
National Fraternal Society of the Deaf
National Rehabilitation Association
Professional Rehabilitation Workers with the Adult Deaf
Registry of Interpreters for the Deaf
Southeastern Athletic Association of the Deaf
Union League of the Deaf
World Federation of the Deaf

The network of CAT_{ij} linkage has helped select and assemble some of the pertinent information about this elite group and its structure, yet what has been related here is but a glimpse of a societal structure. The 33-member group includes only one woman and one Black, though deafness occurs indiscriminately; it is not at all certain that even these two representatives of deaf minority groups would have been found closely linked into an elite group a few years earlier. Although the members of the elite group are not then representative of the variety in the deaf population, the kinds of information pulled together by the CAT_{ij} technique can be used to deal with other important ethnographic questions.

The language of the network. False and disingenuous statements are commonly made about deaf society, as they are about other linguistic minorities. Falsehoods achieve wide circulation and general acceptance long before their falsity can be revealed by careful study of the characteristics of the group. This statement, often heard by those who work with deaf persons in educational settings, is an example: "In our schools we must teach proper —or correct or 'straight'—language (i.e. English); sign language is useless to the deaf person who wants to get on in the world; the deaf had better forget sign language and concentrate on learning proper English."

Nothing could be more mistaken. Among the 33 deaf persons in the elite group here described, the level of proficiency in English, especially written English, is high as the educational attainment and present positions of the members would lead one to expect. However, there are members of this group whose positions and successful functioning in them call for clear and effective communication, which is not always the same thing as correct formal English; many of them deal daily with persons whose competence in the English language is indeed slight. More important, though, is than in the network and even more so within the subgroups, the language used for the all-important internal linkage is some variety of American Sign Language (Stokoe, Woodward). ASL, moreover, may be accounted the native or first language of 13 of the 33, who began signing before age 6. Nineteen of the 33 report that their deafness occurred before their sixth year, so that even if some of the 19 may not have acquired ASL until after age 6, it may still be the first language in which they could have unhampered, comfortable communication with their peers, whatever the language native to their parents.

A more powerful indicator that ASL is the central interactive system, the language, of the elite group is a product of the CAT_{ij} analysis. Interviews to obtain the CAT_{ij} input data (i.e. the ranking of all by each) were conducted in ASL—in most cases, admittedly, a variety of ASL closer to English in structure than unpidginized ASL (see Woodward & Markowiz, chapter 1 above). One of the 33, however, did not allow the interviewer to use signs or fingerspelling, used no manual action in his responses, and insisted on the use of spoken English by the interviewer. Although his first contact with some members of this group was made fourteen years before the study was made, it often happened that one of the others being interviewed, on seeing this person's name on one of the cards to be ranked, would ask, "Who's that?" The effect of this on the output has already been referred to: the person in question has but three links to others, one link from, and one reciprocal link. In the program output from its processing of 33 arrangements of 33 numbers, the cognitive category of interaction was almost non-indicated. Cognitively, that is, the other members of the elite group did not consider this person to be a member.

Furthermore, a converse example confirms that the use of ASL as primary interactive language is essential to the elite communication network. Another member of the 33 person group would be expected, because of factors already looked at, to be an outsider also or a marginal member. Becoming deaf only two years before the study was made, he had used sign language for only a few months before the first interview. Not only was his acquaintance with the others of short duration, but his experience with sign language was equally new. Nevertheless, instead of showing up in the output as one on the perimeter or tenuously linked with a subgroup or two, he is to be found in the vital, young-executive subgroup A. More than that, he belongs in both of the maximally linked triads of A and has additional linkage with those outside this subgroup. His tragic death little more than one year after the study began—from the same illness that caused his deafness—was treated as a signal loss by the whole group and a great personal loss to the Deaf community.

The importance of sign language as the channel for communicating in this network is shown powerfully but oppositely by these two instances. Early deafness, long acquaintance with the group, or one's contemporaries in it, the special educational experience of Gallaudet College, a key position in the special institutions concerned with the education of deaf persons, and even regular professional contact with several members of the elite group—all these do not suffice to tie one into the elite network, if one does not use its language. Yet another person, with only a single one of these qualifications (professional position) but who had a willingness to use and communicate in ASL, not only belongs in the group but may even hold a special and central position within it.

Sign language and its importance to the elite and the whole Deaf society it serves are therefore not as they are commonly represented by some who profess to "serve the deaf." There are other misconceptions as well which the combination of ethnography and network studies can clear up.

Who will lead them?

One misconception deals with the nature of the deaf elite group itself. One of the writers can recall hearing often, during his introduction to the Gallaudet College milieu, this pontifical refrain (here slightly paraphrased): "Oh, yes; so-and-so is bright and able; but you're wrong if you think he is deaf. The leaders among the deaf are the hard of hearing and the ones who lost their hearing in their teens after they had language."

This often was the response to the writer's praise of a deaf colleague, and was only thinly veiled contempt for the deaf (usually pronounced "deef" in this context). And yet, like other sociological generalizations based on little or no study, it might contain truth as well as error and the very objectionable patronizing tone.

Examining the elite network has brought to light a strong age-set solidarity; it also reveals a dynamic: the composition of the group may be seen to change in time. If we look at those among the 33 who are over sixty, we find one who became deaf in childhood and the rest deafened in their teens, with the average age of onset of deafness a little more than 15 years. But in subgroup B, the next age cohort, the average age at onset of deafness is 4.3 years, with three of the eight members of B born deaf. And when all those in the whole elite group under 40 years of age are considered, a total of eight, we find four were born deaf, two others lost their hearing at five and six, and none could hear after age eight.

If it was once true, say thirty or forty years ago, that the leaders in the Deaf community were deafened, not deaf, it is quite clear from this study that those who lead tend to be those born deaf or becoming deaf in infancy. And if hard of hearing persons once had roles of importance in the affairs of Deaf Americans, it is not true now. Only one of the 33 considers "hard of hearing" a more appropriate description than "deaf" (but this goes with other indications of non-membership in the group considered above). Decibel ratings of loss of hearing, where available, bear out this self-judgment. The sociograms presented here confirm recent evidence that there is an emerging awareness of and pride in the community and its control of power (Vernon 1974). Although looking at the ages of onset of deafness in the age groups (over sixty to under forty) represented in the study seems to show a tendency for fewer late-onset and more early-onset members in the elite group, this is probably not a direct function of passing time but much more likely a return to the situation in American (and in French and other continental) Deaf society that obtained before the late nineteenth century oralist movement banished sign language instruction and literally wiped out a considerable educated community of deaf persons in one or two generations.

One of the most interesting areas for further study is that portion of the Deaf community in which the acquisition of the group's language and acculturation can take place earliest and most naturally; i.e. among families in which deafness is inherited and present in every generation. Among the great majority of deaf persons—nine out of ten deaf children have hearing parents—full socialization into the group is likely to take place later, at school age, or at school leaving age (Meadow 1972). The powerful effect of enculturation within the child's immediate family instead of at school and of learning the language and standards of the group in infancy instead of much later can be seen clearly in the elite group: six of the 33 have deaf parents; this is about twice the proportion in the deaf population generally. All six of these and seven more members of the whole group began signing before the age of 6. From the structure, composition, and dynamics of the elite deaf network, it appears not only that the deaf are increasingly leading and managing their own affairs but also that those deaf from birth or infancy, those with deaf parents, and those who began signing with others early in life are emerging as leaders in this society. The inference that ought to be made by teachers and parents of deaf children is very clear: those deaf children not enculturated naturally in a home with deaf signing parents will have the best chance of rising in the society to which they will inevitably belong if they begin learning and using sign language as a natural language as early as possible.

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PART FOUR

BIOLOGICAL AND INTERACTIVE ROOTS OF SIGN LANGUAGES

Studying languages as they connect with cultures and connect and separate members of cultures adds a necessary social dimension to the study of linguistic codes. But just as important and possibly prior logically is studying the psychophysical functions that make language possible at all. The fields of perception and of voluntary and involuntary muscle action, not to mention cognition and communication, are too immense for this last section; but there are good reasons to believe that studies in these areas will be especially rewarding.

Patricia Siple in Chapter 14 reminds us that how we see is fundamental to how we use vision to see language expressed—especially when hearing is inoperative; that handshapes and action are seen by different structures (compare pp. 14-17 above); and even that signers' eyes may be telling us to look harder at faces than at hands.

Adam Kendon's chapter clearly shows that the roots of sign expression lie deeper than those of spoken expression, and hence that gestural behavior may have shaped the internal parts of language more and earlier than did vocal output. Chapter 15 also introduces a new area of study, interaction: beneath language is communication and beneath both is interaction, the behavior of organisms controlled by a feedback system.

The last chapter could well have been first, for it shows us an aboriginal model of language. The children described by Susan Goldin-Meadow and Heidi Feldman heard no language spoken and saw no language signed, yet by the end of the study they "had language" in their gestures. Two factors explain: like all children they were born with human language propensity; and like no others in their circumstances they could interact with fellow beings ready and able to treat their gesturing attempts from the first as language becoming.

PART FOUR: 14

VISUAL CONSTRAINTS for SIGN LANGUAGE COMMUNICATION

Patricia Siple

Language & modality. Production of the signals of any language must to some extent depend on the modality of that production. The vocal apparatus can produce only a limited range of all the sounds that a human ear can detect, and there is certainly a limit to the possible duration and sequencing of these sounds. Similarly, the production of language signals must be related to the perceptual system receiving them. A difference between two sounds must be a difference that the hearer can immediately, accurately, and automatically detect before that difference can be used to convey a distinction between two elements of a language. The production of language signals, therefore, must be constrained by the apparatus used to receive them. We would expect that sign languages of the deaf would evolve in such a way that their units would become less perceptibly ambiguous. Since sign languages are received and initially processed by the visual system, we would expect that the rules for the formation of signs of a sign language would be constrained by the limits of the visual system.

One of the important limits of human vision is that it is not equally acute in all parts of the field that it takes in. When we focus on a point, we can see a great deal of detail in the area immediately surrounding that point, because the image of the point and its area falls on the most sensitive part of the retina of the eye, the fovea. Farther away from the fixated point, we can see less and less fine detail.[2] We might then expect the formation of signs in a sign language to depend on where they are located in the visual field of the sign receiver. Further, if the person to whom the signs are addressed watches the signer by focusing on a particular spot, we might expect fine detail in the signs to be important in that location. Signs in that location should differ minimally from other signs made there by smaller changes than do signs made in places farther away from the point of fixation, where such fine detail would not be detected.

Our observations indicate that signers do indeed have a fixed place of focus. When deaf signers are conversing, the receiver tends to look at the sender's face. Eye movements that do occur tend to be small excursions about the signer's face. This may seem strange, given that sign is a gestural language in which the hands have a large role, until we realize that the face gives very important cues to the meaning of a signed utterance (Bellugi & Fischer 1973, Liddell 1977, Baker 1976). We can use this information about where a person attending to signing habitually looks, along with the knowledge that we have about the human visual system, to make predictions about the form that signs will take in any sign language.

Relative acuity. In order to recognize a sign, a viewer must be able to discriminate that sign from others similar to it. Stokoe (1960: 41f) posited three aspects as constituting the ways in which one sign (morpheme) can differ from another: configuration of the hand or dez, location or tab, and motion or sig. [More recently, what acts, where it acts, and its action (see Chapter 1.)] We should expect the limits of the visual system for perception of fine detail to affect the degree to which these aspects of signs themselves are finely or grossly different.

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[2] This is easily tested: Focus on a word in the middle of this page; words immediately around can be read easily without a shift in fixation, but those farther away are indistinct.

Visual acuity, one limit of the system, is measured by various methods. Most familiar is the Snellen chart of letters of graduated sizes, commonly found in most doctors' offices. Optimal acuity occurs when the observer looks straight at a letter to focus the figure on the fovea. Acuity is then reported as what the eye sees at 20 feet relative to what the normal eye sees; thus, 20/20 acuity is normal, and an eye with 20/80 acuity sees the same detail at 20 feet that the normal eye sees at 80 feet. Another method of measurement uses a broken circle, known as the Landholt C, presented at a given distance and under a standard level of illumination. Acuity is then defined as the size of the gap necessary in order for the observer to determine whether the gap is at top, bottom, left, or right.

Acuity is best at the point of fixation; it drops off rapidly as the distance from that point increases. Visual acuity across the visual field has been measured as a function of this distance from the fixation point by Mandelbaum and Sloan (1947), using the Landholt C. Their data for photopic illumination (like that of a normally lit room) is shown in Figure 1 as the relation of acuity to angular distance. The distance from foveal fixation is measured in degrees of angle, since this method relates distance from the eye to distance away from the center of fixation however near or far the visual field. Thus the relative acuity is the same 20 inches away from center at ten feet of distance as 4 inches away from center at a distance of two feet. A relative acuity of 0.5 means that the size of the gap in the Landholt C must be approximately twice that needed to be perceptible in central vision. Figure 1 shows that this level of acuity is only about 2 degrees from the center of vision, and that acuity 10 degrees from center is reduced to one-tenth that at the point of fixation. Other methods of measuring acuity, e.g. use of the Snellen chart, produce similar findings (Ludvigh 1941).

These findings have direct implication for the reception of sign language. Suppose a person receiving a sign language communication is placed six feet from the signer. (Six feet is chosen here because observation shows that this is a good approximation of the distance signers actually choose when in conversation. This six foot

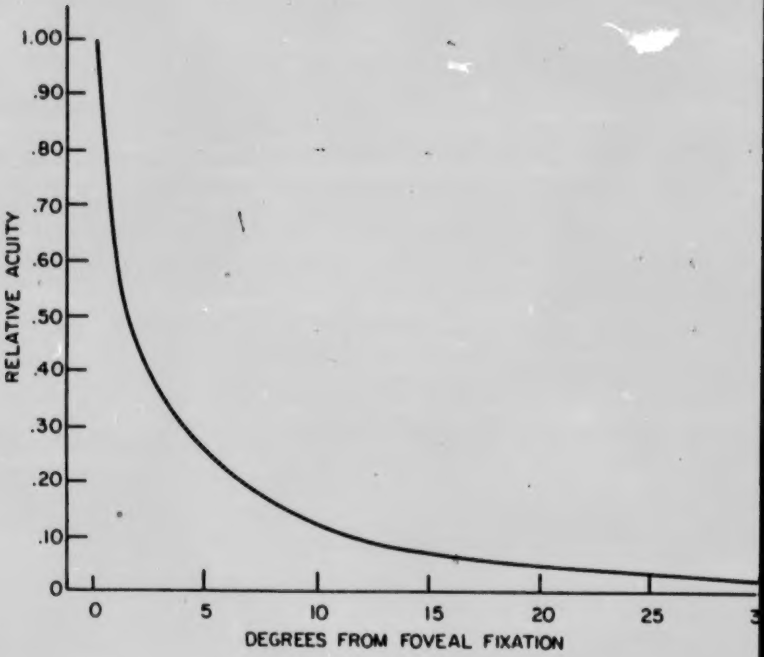
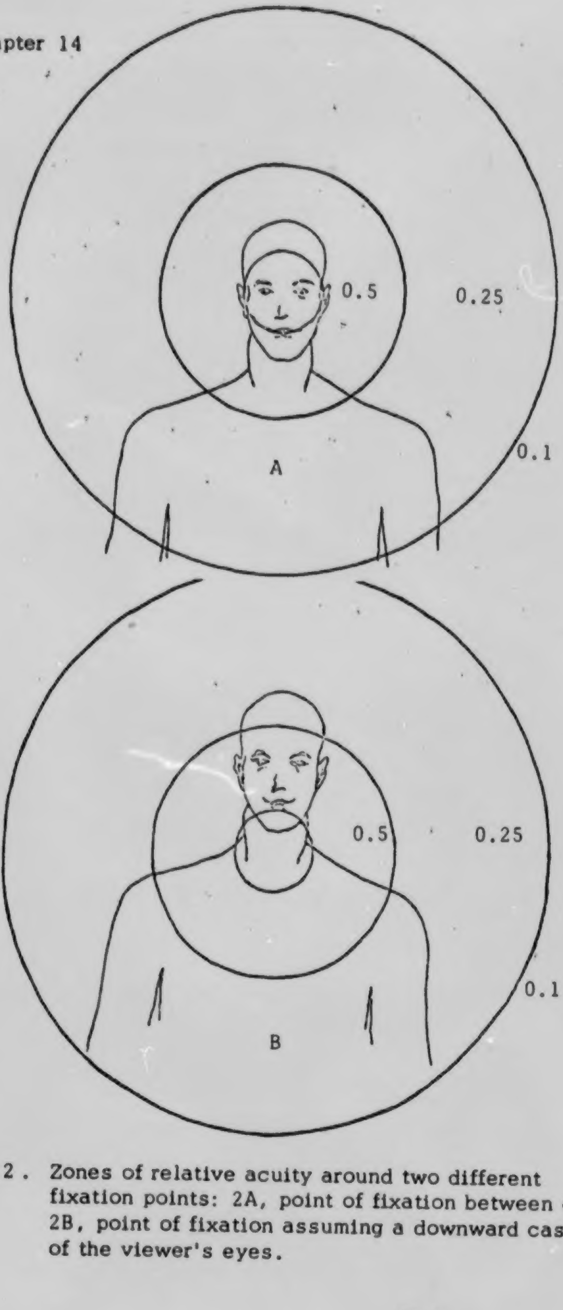


Figure 1. Relative visual acuity as a function of degrees of eccentricity from the center of the fovea (From Mandelbaum & Sloan 1947).



ure 2. Zones of relative acuity around two different fixation points: 2A, point of fixation between eyes, 2B, point of fixation assuming a downward cast of the viewer's eyes.

distance also falls within the range of social distance described by Hall (1966), the distance used for conducting impersonal business as well as for conversing with friends and associates. Interestingly, Davis and Silverman (1970) report that a distance of six feet is the most comfortable distance for speechreading.) Now, if the viewer six feet from the signer looks directly at the latter's nose and eyes, the center of the face, the area of greatest relative acuity (1.0 to about 0.5) is approximately the size of the face (sin 4° X 72" = 5"). Figure 2a shows three zones around the center of the face. Within the inmost circle relative acuity is maximum. In the next zone acuity is between one half and one fourth of maximum. In the outer zone acuity drops to one fourth to one tenth of that at the fixation point; and beyond the outer circle it is less than one tenth.

Fine detail can be seen by the viewer on the signer's face and in the zone around the face. Some detail can be picked up out to the shoulders and down to the upper chest, as acuity in this zone is better than one fourth of maximum. But at the outer circle or beyond, a line would have to be ten times as wide as at the nose for the signer to see it.

The diagram of the visual field shown in Figure 2a does not show the most comfortable line of sight for the normal viewer. Design engineers point out that the eyes naturally assume a downward cast (Morgan et al., 1963). Figure 2b shows the field divided into the same zones of relative acuity, but with the fixation point lowered to allow for this downward tendency. Note that this lowered gaze still keeps the face in an area of reasonably high acuity. The two points of fixation used in Figure 2 are those most likely to be used by the receiver of signed communication. Eye movements, which can occur as often as every 200 milliseconds, should tend to occur between and around these two points.

If we assume that a sign language evolves so that it becomes maximally visible, we would expect the formational characteristics of its signs to depend on their location in the visual field. In particular, we would expect differences in fine detail to be more important in the regions of higher acuity. Small differences in position, in motion, in number of fingers and overall handshapes can be easily detected in such areas. Farther out from fixation point, only gross differences in these aspects of a sign can be detected. We would expect to find pairs of signs made in the areas about the face or upper chest to be visually more similar, i.e. to differ in a less detailed way, than signs made in the areas of lower acuity. Thus in high acuity areas, we might expect to find pairs of signs that differ only by the number of fingers extended (e.g. G-hand versus H-hand, or RED/SWEET in ASL). We would also expect to find a small difference in location (e.g. chin to cheek or nose to upper lip) to be a minimal distinction between signs in the area of highest acuity. The set of signs made in the regions of lower acuity should not contain such pairs. We would expect to find there only gross distinctions like the difference between a closed hand and an open hand (A/B or 5). In addition, we know that many signs in ASL are made in the open area in front of the signer's body. It is assumed that most of these signs are made above some plane as lower limit. While it might be thought that a reasonable lower bound for these signs might be the plane of the forearm resting horizontally, acuity data would lead us to predict a slightly higher plane—one nearer the end of the sternum. A look at the Dictionary of ASL (Stokoe, Casterline, & Croneberg 1976 [1965]) will show that these predictions are confirmed.

Conditions of low acuity. The amount of information that can be taken in from peripheral areas of vision is small compared with that gathered near the point of foveal vision. Yet signs are made in these peripheral areas. As we have seen, perception of these signs can be enhanced by keeping minimal distinctions large. Perceptual data indicate, however, that other properties of the visual sign stimulus can be utilized by the sign system to maximize information that the eye can gather in areas of low acuity.

It has been shown that large motions increase the probability of perceiving the less-detailed information to be obtained from peripheral areas (Kulikowski 1971). Such large motions may, however, detract from information received in areas of high acuity, where small motions enhance the perception of this more detailed information. Thus we would predict that signs made on or about the face and upper body will have small motions and that signs made off and to the sides of the body will have large motions. Furthermore, when these large motions are made, we would expect them to be made along the vertical and horizontal axes, since acuity is greater along these axes than for other orientations (See Springer 1972).

Another variable that will increase the amount of information obtainable in an area of low acuity is the amount of redundancy in the information presented. Cherry (1966: 308) has broadly defined redundancy as "a property given to a source by virtue of an excess of rules... whereby it becomes increasingly likely that mistakes in reception will be avoided." Redundancy can occur as the repetition of elements or as the addition of elements to convey information already implicit in the stimulus. There are two ways that redundancy can affect the communication of information (Coombs et al. 1970). First, there can be redundancy within a stimulus; i.e. an overlap of information can be produced by increasing the number of elements or features in the stimulus so that more than one element conveys the same information. Such redundancy will increase the ability to receive the information over and above the deficit produced by increasing the number of elements making up the stimulus. This is accomplished by incorporating within the recognition system a set of rules that allow it to use the incoming information more efficiently. For example, in the phonetic alphabet used for voice communication (e.g. saying "Able, Baker, Charlie..." for 'A, B, C...'), the complexity of each of the stimuli has been increased over that of the names of the English letters; i.e. a multi-syllablic word has been substituted for each letter name. The listener has a chance of recognizing one or more parts of the word, each one of which will help in inferring the letter represented. The probability of recognizing individual letters has thus been increased by increasing internal stimulus redundancy.

Redundancy can also be thought of with respect to the entire set of possible stimuli. Redundancy between two stimuli is determined by the proportion of elements of one stimulus that can overlap with (convey the same information as) the other stimulus. This concept can be extended to a larger set of stimuli. While a great amount of redundancy within a stimulus will aid in its recognition, redundancy among stimuli will decrease the ability to discriminate one stimulus from another and thus decrease recognition ability. In the English alphabet, for example, many letter names have common acoustic elements: BCDEGPTVZ.

Such sound similarities have been eliminated from the phonetic alphabet; no syllable can be found in more than one letter name. Lack of this type of redundancy enables the listener to discriminate letters in a sequence, provided the listener gets some information about each letter presented.

Both these aspects of redundancy can be directly applied to the transmission of information in a sign language. We would expect these considerations to become especially important in areas where acuity is greatly reduced. First, we would expect a greater amount of internal redundancy within a sign in these areas. There are at least two ways that this redundancy can be incorporated: elements can be added by using two hands instead of one; and information presented to one side of the visual field can be duplicated on the other side. The latter doubling of information requires that the handshapes and movements on each side are symmetrical. If the viewer expects this symmetry (i.e. if it is a rule of sign formation), then the probability of correctly receiving the information and recognizing the sign will be increased. We would expect therefore the signs made in peripheral, low acuity areas to be two-handed symmetrical signs. Because signs are produced sequentially at a rapid rate in natural conversation, the sign receiver also needs to discriminate very quickly between similar signs. Therefore, as in the phonetic alphabet, we should expect to find in the large peripheral two-handed symmetrical signs more redundancy than in those signs made on or near the face and upper chest.

Considerations of redundancy may also help to explain certain characteristics that have been noted in ASL. There is often a great deal of repetition of individual signs in signed discourse. While some kinds of repetition have been shown to serve grammatical functions (Fischer 1973, Supalla 1977), others remain puzzling. Nevertheless, repetition is an easy way to increase redundancy. An examination of non-syntactic repetition in a sign language might be expected to show that it occurs most often within a set of signs that are difficult to recognize or predict, but which are important for understanding a signer's meaning. We would also expect more of this kind of repetition under adverse signing conditions or when the message is very important.

Signs in ASL are sometimes formed from the combination of two existing signs; e.g. the sign for 'brother' was formerly signed by successively signing BOY and SAME. Such a compound originally maintained the locations and hand configurations of the two constituent signs and joined them with smooth transitional motion. As sign language has changed, however, the forms of these compounds have changed in systematic ways. In their original form, compound signs tended to be large signs, since they comprise two different signs; over time the location of one or both parts tends to change so that the two locations are closer or become one. Often too the new location or locations of the sign are in an area of higher visual acuity. In other cases, the sign becomes more symmetrical, both hands assuming the same hand shape and movement changing toward symmetry. (For confirmation of these predictions, see Frishberg 1975) Such changes, by increasing the internal redundancy, make the sign more easily recognizable. To the extent that a sign language makes use of compound signs, we should expect to find similar changes toward increasing internal redundancy in any sign language.

Illumination & contrast. Two other variables are known to affect acuity: overall illumination (Pirenne 1962) and the contrast in luminance between different parts of the visual stimulus. In fact, the amount of contrast necessary for perception can be viewed as a measure of visual acuity (Westheimer 1972). Since these variables tend to be environmentally controlled and to some extent random over a wide range during signing situations, we would not expect them to provide constraints on the formation of signs in a sign language. We might, however, expect that the behavior of the signer and perhaps that of the viewer would be affected by them.

Below a certain limit, when illumination decreases visual acuity decreases, but this decrease in acuity is not constant across the visual field (Mandelbaum & Sloan 1947). In fact, at some point the periphery becomes more sensitive than the fovea, because the rods, the receptor cells in the periphery of the retina, are more sensitive at lower light levels than are the cones in the central portion of the eye.[3] There are several reasons why we should not expect this reversal to affect sign formation. First, it does not occur until illumination is very low—below the level of illumination on a starry moonlit night. Also, while the periphery is more sensitive than the fovea at these light levels, actual acuity at the most sensitive part of the periphery is less than 8 percent of the acuity for the center of the eye under the light conditions shown in Figure 1. Because we see so poorly in such low illumination, we would expect very little signing to occur, and thus would not expect sign formation to adapt itself to such viewing conditions. For the most part, a sign language will be used under conditions like those for which Figure 1 holds. If a language evolves so that it is efficient under conditions in which it is most likely to be used, the curve of Figure 1 should be of use in predicting the form of the language. On those rare occasions when signing must occur in low levels of illumination, we would expect the signer or the viewer to compensate for this reduction in visual sensitivity. Westheimer (1972) has pointed out that such compensation can occur by increasing the time duration of the stimulus. He states that increasing duration can increase acuity for durations up to two seconds under some conditions. We would therefore expect the signer to slow down the rate of sign production. We might also expect the viewer to move closer to the signer. However, this distance is often strongly controlled by physical and social conditions. If no compensation were made for the low level of light, we would expect the viewer to make errors in interpreting the signs.

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[3] You can demonstrate this to yourself on a starry night. First fixate on a star and note a dim star nearby; then try to fixate on the dim star. Surprisingly it will disappear as it comes into the center of vision!

Contrast, as noted, may be viewed as a measure of acuity; instead of widening the gap in a C or the width of a line, it is possible to increase the contrast between figure and ground to make a pattern (e.g. stripes) easily detectable. Such contrast data, if determined from fovea to periphery, would take the same form as the acuity relation shown in Figure 1. Data from Campbell and Gubisch (1966) indicate that the kind of information picked up by the peripheral area of the eye requires much higher contrast for detection than that picked up in the central area. Thus, we would again make the same predictions as for those based on acuity data. We would expect the sign system to require finer discriminations to be made to detect signs seen in the central portion of the visual field than for peripheral signs.

Contrast level certainly varies from one signing situation to another. As with luminance, we would expect a sign language to have reached a maximum efficiency for the normally found range of contrast levels. If for some reason the contrast were lower than usual, we might expect the signer to slow the rate of sign production in order to increase acuity for the viewer. If the signing rate were not reduced, we would expect the viewer to make more errors in recognition. When it is important that the viewer understand the signer with low or zero error rate, the signer can increase contrast by wearing dark, solid-color clothing. This is most important in situations where the signer has little control over rate of signing, as when interpreting spoken discourse for deaf audiences. Instructions to interpreters usually suggest that they wear dark clothing.

Summary. The assumption has been made that a language will be shaped to some extent by the sensory system used to perceive its signals. A sign language is received by the human visual system, and so knowledge about that system can be used to predict certain constraints that may operate in a sign language. From data on visual acuity we predict much finer distinctions will be made in the handshape, location, and movement of signs performed near the center of viewer vision, i.e. signer's face and upper body, than in the same aspects of signs farther away from center of fixation. We predict that signs made in the outer, more peripheral zones will have large movements tending to follow horizontal or vertical axes, in order that the viewer's ability to detect differences may be enhanced. In addition, from data on redundancy in information transmission and reception we predict that signs made in peripheral areas of vision will be or will tend to become signs made with two hands instead of one and symmetrical in handshape and movement; signs with these characteristics are not very similar to one another. Luminance and contrast are not expected to affect the sign production system itself except in the sense that the system should make itself understandable under normal viewing situations. Abnormal situations would be expected to affect either the rate of signing or the amount of information obtained by the viewer.

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PART FOUR: 15

GESTICULATION, SPEECH, & THE GESTURE THEORY OF LANGUAGE ORIGINS

Adam Kendon

The gesture theory. Gordon Hewes (1973a) has revived the argument that speech is a late development in human evolution and that the first manifestations of a language capacity were in systems of gesture. He adduces several different lines of evidence in support. First he points out that language in its first form would have made use of such neurological and anatomical equipment as the prelinguistic hominid already had available to it. The neurological and anatomical specializations associated with speech (Lenneberg 1967, Geschwind 1972) would have evolved only after the evolutionary shift in the direction of linguistic-like behavior. As Mayr (1968) has pointed out, behavioral change is always the first kind of change to take place in evolution—morphological change following later. Hewes argues that the findings of the Gardners (1971), in which the chimpanzee Washoe has been shown capable of learning some elements of a gesture language, support the contention that in terms of brain structure the pre-linguistic hominid would have had the cognitive capacity for a linguistic form of communication, even though it did not have the anatomical specializations suitable for speech. Hewes also points out that chimpanzees exhibit naturally much behavior that could be regarded as a substrate for gestural language; e.g. they orient to and address behavior towards specific other individuals, they show certain limited amounts of gestural communication, and they can make use of each other's postures and incipient locomotory movements in gaining information from one another about the environment (Menzel 1971). Hewes also refers to the work of Lieberman (1973) and colleagues, which suggests that the vocal tract of Neanderthal man was not suitable for the production of fully articulated speech. Yet evidence of burial practices, tool making, and hunting among these people makes it highly likely that they were capable of linguistic communication of some sort. Hewes suggests that it is plausible to suppose that this was a predominantly gestural form.

Hewes further points out that comparative study of the vocal systems of primates and humans, both of their functions and of the neurological apparatus that controls them, has made it clear that the call systems of primates that have been regarded in earlier treatments as a possible substrate for the emergence of speech (e.g. Hockett and Ascher 1964) are not related to the vocalizations used in speech by humans (Reynolds 1968). On the other hand, the lateralization of both the speech function in the brain and of the control of skilled movements as suggested by the development of handedness suggests that we should consider the possibility that there is a close association between the development of speech and the development of skilled manipulation of the environment. In another paper (1973b) Hewes has elaborated on this point, suggesting that there is a close relationship between the development of tool use and the development of language, a relationship that becomes much easier to comprehend if language first emerged as a gestural system. In a summary of some recent studies of lateralization, Kimura (1973) has pointed out that the dominant hand is involved not only more heavily in skilled movements but it is also used predominantly in the hand movements that accompany speech. Furthermore, there is some indication from the literature on brain damage that the same lesion may affect both motor skill sequences and sentence construction, thus providing further support for the intimate relation between environmental manipulation and language, a relationship much easier to understand if language first appeared in gestural form.

Hewes' position depends upon the view that the communicative functions of language are not intrinsically bound up with the properties of the linguistic code that is made use of by speech. If it were shown, therefore, that linguistic communicative functions carried out by bodily movement or other means besides speech were secondarily derived from speech and did not function as systems in their own right, his argument would be greatly weakened. There are many different functions of language. However, the most distinctive of its communicative functions seems to be that it enables users to tell each other things. That is, it enables users to give accounts of their thoughts, feelings, perceptions, and memories, and of things that may not be happening at the time of the telling and which may not be witnessed directly. This function, which we shall here call the reportive function, combined with a capacity to communicate reportively about virtually anything, would appear to be the feature of language which sets it off most distinctly from all other communicative systems. For Hewes' position to be sustained, it is of great importance to know whether systems of gesture can function reportively in this sense and whether they do so after their own fashion, and not as a system derived from speech, as writing clearly is, for example.

It has been well known for some time that sign languages have been used by such peoples as the North American Plains Indians (Mallery 1881, 1972) and the Australian Aborigines (Roth 1897, Mountford 1938, Berndt 1940, Meggitt 1954). Also well known are the sign systems used by the deaf; and extensive and sometimes apparently autonomous use is made of gesture in communication by Latin peoples, especially in Southern Italy (di Jorio 1832, Rosa 1929, Lyall 1956). Recent intensive work on some of these systems has made it clear that while in some cases (such as the sign systems used by Trappist Monks; see Barakat 1975) such sign languages are derived from spoken language, so that they may be thought of as a kind of "gesture writing; " in other cases the gesture system is organized according to its own principles that have little in common with spoken language and yet the system is able to operate, because of sufficient elaboration both in vocabulary and syntax, with much the same effectiveness. Thus La Mont West (1960) undertook a very detailed study of a version of a North American Plains Indian sign language and showed that it could be seen as an almost wholly autonomous system. He pointed out that its grammatical structure makes use of spatial rather than temporal relations and that extensive use is made of visual onomatopoeia. It seems highly likely that the sign languages of the Australian Aborigines are similarly elaborate and autonomous (West 1963).

Extensive work has now been done on sign languages of the deaf. From this it has become clear that here also we encounter systems that are organized according to principles quite different from those of spoken languages, and that also function fully as effectively (Stokoe 1972, Cicourel and Boese 1972, Schlesinger 1971).

These findings lend strength to the view that the capacity to communicate reportively is not dependent upon specific ability of speech, though it might be argued that these sign languages, autonomous in their organization though they may be, are but manifestations of an inventiveness that has arisen as a result of capacities made available through the development of language and that they tell us nothing about how language itself may have first emerged. However, if it could be shown that a proclivity to communicate reportively by gesture is spontaneously present in the human species, this would make it much less likely that sign languages are consciously developed artifacts designed to meet particular situations. It would suggest that reportive communication by gesture is at least as fundamental a process as is speech and that, at the very least, reportive communication in gestural and vocal form emerged concurrently.

Tervoort (1961) has described how reportive communication by gesture arises quite spontaneously among very young deaf children. He shows that they very readily invent mimetic forms in movement to represent things they wish to refer to and that these forms, in some circumstances, come to be used by several children. As they do so they undergo a rapid process of simplification and conventionalization and they may become fully incorporated as a part of a shared sign system which functions in a fully reportive fashion. This would suggest that human beings will fashion a language out of whatever behavioral materials there are to hand, and that this will be done gesturally if no spoken language or the capacity to produce or receive one is available.

Another line of evidence will be pursued in this paper. We shall review findings from some detailed studies of the organization of bodily movements that occur concurrently with speech. As we shall see, this work shows that this bodily activity is so intimately integrated with the activity of speaking that we cannot say that the one is dependent upon the other. Speech and movement appear together, as manifestations of the same process of utterance. That is, in the translation of "ideas" into observable behavior, typically addressed to specific others and which is read by those others as reportive of these ideas, the output that results is manifested in both speech and movement. Circumstances of utterance may affect the degree to which either is enhanced, but where gesture is used to the exclusion of speech we see but a special emphasis of an ability all of us possess, an ability as fundamental, if not as usually well developed, as speech itself.

Speech and body motion relationships in the utterance. When a person speaks there is always some movement in the body, besides the movements of the jaws and lips that are directly involved in speech production. This speech-associated movement may be slight and comprise not more than a minor bobbing of the head or occasional movements of the eyes and eyebrows. Quite often, however, movement may be observed in other parts of the body as well, most notably in the arms and hands. These movements may become more complex and extensive and, when they do, we shall speak of the one making them as gesticulating.

Ekman and Friesen (1969) have distinguished this kind of movement with the use of the term "illustrator". We shall use the term "gesticulation" in preference, however, for it is a more neutral term and it implies nothing about the possible relationship between these movements and concurrent speech. Furthermore, "illustrator" suggests a discrete entity. "Gesticulation", on the other hand, refers to a process of activity and as such seems more appropriate for what is, after all, a very fluid and dynamic phenomenon.

Gesticulation is to be distinguished from movements such as those engaged in when the individual scratches his head or adjusts his clothing. Movements of this sort, referred to as "body focussed movement" by Freedman and Hoffman (1972) and as "self adaptors" by Ekman and Friesen (1969), though they do occur in speakers, may also be observed in individuals at other times. Gesticulation, however, only occurs when someone is actively engaged in an utterance, usually within a focused interactional event. Body focused movements of course may be quite revealing of the individual's motivational or organismic state (see Krout 1935), but they appear to occur in spite of the individual's participation in an utterance exchange and are not part of it. To use Goffman's terminology (1974), they are treated as part of the "dis-attend track" in face-to-face interaction.

As has just been noted, an individual engaged in an utterance typically is also a participant in an utterance exchange within a focused interactional event. He is thus a participant in a complex of systems of behavioral relationship;and much of his behavior that can be observed, often intimately intertwined with the behavior of utterance, functions in the maintenance and management of these systems. Thus there are aspects of posture and orientation, patterns of head movement and gaze, movements of the hands and arms, and vocalizations which play a crucial part in the organization of the interactional event. These aspects of behavior have been dealt with by Scheflen (1963, 1964,1973), Kendon (1967, 1973), and Duncan (1972, 1973), among others. In any full treatment of the behavior of language they must be considered in detail, for they comprise an important part of the way utterances are managed as acts of interaction. For the present, however, we shall leave these aspects of the behavior of language to one side. As Goffman (1974) has put it, these aspects function in the "directional track" of interaction. Here we are concerned exclusively with the behavior that is directly involved in what Goffman calls the "story line" of the interaction.

The movements of gesticulation and their relationship to speech may be analyzed by a close inspection of examples recorded on 16mm sound film. By use of a hand-crank operated time-motion analyzer, it is possible to examine and re-examine the film frame by frame or by short stretches of several frames at a time. A detailed map may be made of the movement patterns observable, which can be plotted on a chart to show their development in time to the nearest frame. Using standard sound-film rates, this means that we can analyze the behavior to the nearest twenty-fourth of a second. Such a map of the movement patterns may be matched with a phonetic transcription of the concurrent speech, which can also be plotted against the frames of the film it matches. In this way, the relationship between body motion and speech may be examined to the nearest twenty-fourth of a second (or to smaller intervals of time, if the appropriate film speed is used). Details of these procedures were first described by Condon and Ogston (1966, 1967), and an account may also be found in Kendon (1970, 1972).

The first work in which this approach was used was that of Condon and Ogston (1966, 1967). In this work an extremely detailed study of the flow of movement in relation to the speech flow was undertaken. This showed that as the speaker speaks his bodily movement is rhythmically coordinated with his speech rhythm. One of Condon's principal concerns, in this work, has been to explore the degree to which this synchrony of speech and movement is precise. Its significance for our present concern is that it shows that the individual, in speaking, acts as a whole, that speech is not a disjunct action system but that it continuously mobilizes the muscular systems of the whole body.

Condon's work has been conducted at very fine levels of organization. He has examined the synchrony of bodily movement with speech at the verbal, syllabic, and phonic levels of the organization of speech. Here we shall be concerned with much higher levels of organization. As Condon (1974) himself has pointed out, at the level of the phrase and above, we tend to observe parts of the body differentiated out in movement, so that the head, the arm, or the hand, or at times the whole trunk performs phrases of movement that are sustained over syllabic groupings at the level of phrases and, as we shall see, at still higher levels of organization.

In the first study to be considered here, fully reported in Kendon (1972), an extended utterance was analyzed, which was taken from a film made in London. In a London pub, eleven people, who had gathered over drinks with an American anthropologist, were discussing the differences between British and American national character. In the utterance analyzed the speaker maintained a continuous discourse for about two minutes. He directed his utterance to the anthropologist, but in such a way that it also served as an address to the whole group.

The speech stream was segmented into intonation tune units, following criteria given by Roger Kingdon (1958). This yields units which are the equivalent of Tone Units, as these are defined by Crystal (Crystal and Davy (1969). The relationship between these Tone Units was then examined, and they were found to participate in four levels of organization. First, the Tone Units were found to combine into groupings termed Locutions. These generally comprised complete sentences. Locutions were found to combine into Locution Groups, and these in turn were organized into Locution Clusters. Locution Clusters may be thought of as the paragraphs of the discourse. They are set off from one another by a pause or by a marked change in voice quality, loudness, or pitch range, and there is generally a clear shift in subject matter. The Locution Clusters are themselves combined into the highest level of organization of all, the Discourse, which is here the equivalent of one speaker turn.

It was found that each level of organization distinguished in the speech stream was matched by a distinctive pattern of organization of bodily movement. Thus for the duration of the Discourse, the speaker sustained a bodily posture that contrasted with the posture he sustained before and after it. For each of the Locution Clusters within the Discourse, he used his arms differently. Over the first of the three clusters distinguished he used his right arm only; over the second cluster he used his left arm only; while over the third he used both arms together. Within each cluster, each Locution Group was contrasted in the way in which the head moved over each of the Locutions within it. Each Locution began with the speaker's head held erect or raised and tilted to one side. As the Locution unfolded the head was lowered to be brought to a low central position or to a lowered left-tilt position. Locution Groups were distinguished according to whether the head movement pattern was a forward lowering or a forward lowering combined with a leftward tilt over each Locution within the Group. Successive Locutions within a Group were distinguished from one another not only by the head movement cycle we have just described--each Locution starting with the head in a raised position--but also in the pattern of movement in the hand and arm employed. For example, in the second Group in the Discourse analyzed, over the first Locution the left arm was fully extended and retracted; over the second Locution gesticulatory movement was confined to the forearm rotation and movement in the wrist and fingers; over the third Locution the forearm was raised by flexion at the elbow and a succession of lowering movements were then observed. Finally, at the level of the Tone Unit, distinctive movement patterns could again be observed. Thus over the first Tone Unit in the first Locution of the second Group, the left arm was fully extended, it was retracted over the second Tone Unit, and extended again over the third.

The paralleling of organization in the speech stream and gesticulatory stream revealed in this example, together with certain details having to do with the relative timing of the nuclei of the Tone Units and the nuclei of the gesticulatory phrases, led to the conclusion that it is "as if the speech production process is manifested in two forms of activity simultaneously: in the vocal organs and also in bodily movement" (Kendon 1972:205). Analyses of other examples, taken from other sources, have served to reinforce this conclusion. Furthermore, some additional features of the speech-gesticulation relationship have become apparent that allow us to go further in our understanding of how far back in the speech production process the organization of concurrent bodily movement has its origin.

We shall now consider some findings from some other analyses of gesticulation structure in relation to utterance structure. Space does not permit a full presentation, which will be reserved for another publication. In this new work a number of examples of extended utterances have been analyzed, all of them taken from a film made in Philadelphia at the Eastern Pennsylvania Psychiatric Institute. The film, known as ISP 001 63, is of five psychiatrists and a social worker meeting to discuss a patient the social worker and one of the psychiatrists had been interviewing. The film contains many examples of extended utterances, with a good deal of gesticulatory activity.

In this work the speech in selected extended utterances has been analyzed into Tone Units and their various groupings according to procedures already described (Kendon 1972) and outlined briefly above. In analyzing the structure of the gesticulation, however, we made use of the concept of the *Gesticulation Phrase*. This will be more fully presented elsewhere, but the basic criteria for distinguishing it may be summarized briefly.

In forelimb gesticulation the limb is typically lifted away from the body as it performs one or more complex movement patterns, and then is returned to what may be called its *rest position*. *Gesticular Units* thus may be demarcated as extending from the moment the excursion of the limb begins to the moment when the limb is fully at rest again. Within such an excursion the limb may perform one or more *Phrases* of gesticulation. A phrase of gesticulation, or G-Phrase, is distinguished for every phase in the excursionary movement in which the limb, or part of it, shows a distinct peaking of effort—"effort" is used here in the technical sense of Rudolf Laban (Dell 1970). Such an *effort peak* (less technically, such a moment of accented movement) is termed the *stroke* of the G-phrase. It is usually preceded by a *preparation*, i.e. a phase in which the limb moves away from its rest position to a position at which the stroke begins. The stroke is then succeeded by a *recovery* or *return* phase in which the limb is either moved back to its rest position or in which it is readied for another stroke.

Gesticular Phrases, like Tone Units, may be grouped in various ways, so that a Gesticular Unit (G-Unit) may contain more than one G-Phrase. Description is further complicated by the fact that both limbs may be used simultaneously, at times performing in unison, but at other times showing considerable differentiation in the way they are employed.

Several of these features will now be illustrated with a specific example. In Figure 1 a G-Unit and its internal structure is diagrammed in relation to the speech it co-occurred with. In Figure 2 three sketches of S are presented to show his general posture and two main features of his gesticulation. The example is taken from the film ISP 001 63 already mentioned. In this example, the psychiatrist, S, who is presenting the case is commenting on the difficulty he has had in getting the patient in question to give a coherent account of herself. The passage we are concerned with is as follows, transcribed to show its organization into tone units:

> this patient has been a *prob*lem/ so far as a *his*tory is concerned/ uh y'know a very *form*al one/ uh or *any* kind of a *his*tory/ cos she talks very very *rap*idly/ and and *moves* very quickly/ from one area to *an*other/

We are concerned here with the gesticulation that occurs in association with the last five tone units in this passage.

It will be seen from Figure 1 how a single G-Unit extends during the passage of speech in question. It is recorded as beginning at frame 11084, the earliest point in which gesticulatory movement can be observed, in this case in the left hand, to frame 11250, when both limbs have returned to a stable, non-gesticulatory position. This G-Unit, however, will be seen to contain three manual G-Phrases, regarded as being organized into two groupings or Parts, the first Part containing two G-Phrases, both enacted by the left hand; the second Part contains one G-Phrase only, enacted by the right arm. These G-Phrases are regarded as belonging together in a single G-Unit because, in the first place, between G-Ph 1 and G-Ph 2 the hand does not return completely to its rest position. Secondly, as will be clear from Figure 1, G-Ph 3 begins before the recovery phase of the preceding G-Phrase is completed. G-Ph 1 and G-Ph 2 are grouped into Part I because they are very similar in form and in the space they make use of. G-Ph 3 is regarded as belonging to a separate Part, in this case because it is enacted by a different limb. In other examples, where the gesticulation is confined to one limb only, distinct Parts are recognized if the limb moves to an entirely new spatial area for enactment, or if it engages in a sharply distinctive movement pattern.

G-Phrase 1 and G-Phrase 2 are very similar. For both the fingers of the left hand are extended and spread to assume an "umbrella" hand form (i.e. with palm facing down, all digits are extended and abducted, but all are partly flexed at the A-joints). At the same time this development of the "umbrella" form occurs, the wrist extends slightly, lifting the hand away from the chair arm on which it has been resting (see Figure 2). In each of the two G-Phrases, this development of the hand posture and the concurrent wrist extension is regarded as constituting the preparatory phase of the G-Phrase (p_1 and p_2 in Fig. 1). In the Stroke (s_1 and s_2) in each G-Phrase, the wrist is flexed rapidly, moving the "umbrella" hand sharply downwards. In both the stroke is followed by a hold (h_1 and h_2) in which the hand, still in its "umbrella" form, is held still in the position it reached at the end of the stroke. Thereafter, in G-Phrase 1, the fingers slowly flex and draw together into a "loose-bunch" form. This is regarded as a *partial recovery* (pr_1) because the hand does not return all the way to the position it was in before the onset of the G-Phrase. After the hold (h_2) following the stroke in G-Ph 2, however, the fingers are drawn fully together, but at the same time the arm is moved off the chair arm into S's lap. The forearm is then supinated and the hand spread, to form a support for the folder that S is holding (see Fig. 2). Note that in this case the limb is moved, not to a rest position, but to a position in which it is employed in a non-gesticulatory activity.

G-Phrase 3 is likewise analyzed into a preparatory phase (p_3), in which the arm is lifted upwards through flexion of the upper arm (at the shoulder joint); a stroke (s_3) in which the upper arm is rotated inwards and outwards twice, serving to sweep the hand in to the center of S's gesture space and out again; and a recovery phase (r_3) in which the arm is lowered again, and then moved to reassume the position it had before, supporting the folder. The stroke in this case is a *complex stroke*, analyzeable into four components.

Finally, note should be taken of the segment marked GH 1, which occurs during h_1 in G-Phrase 1. This is a gesture of the head, in this case a *head-shake*. As may be noted from the diagram in Figure 1, it is integrated with the gesticulatory activity in the limbs, and as we shall observe later, it bears the same relationship to the speech structure as do the other gestural units. For the present, however, it is convenient to treat head gestures separately, and we have not considered this as part of the gesture phrase organization described for the forelimbs.

A detailed analysis of the relationship between the phrase structure of the gesticular flow and the organization of the speech flow has been carried out on five extended utterances from the film ISP 001 63 from three different participants. There are three general statements that may be made from these analyses:

First, just as we found in the analysis summarized earlier and reported (Kendon 1372), so here, in the two examples in which there were divisions in the discourse at the Locution Cluster level, these Clusters contrasted in their concurrent gesticulation in terms of the way the limbs are involved in gesticulation Thus in F 42, an extended utterance by the social worker, which divides into four Clusters, over the first she uses only her left arm in gesticulation; over the second she uses both arms equally; while over the third she uses both arms, but the right arm is

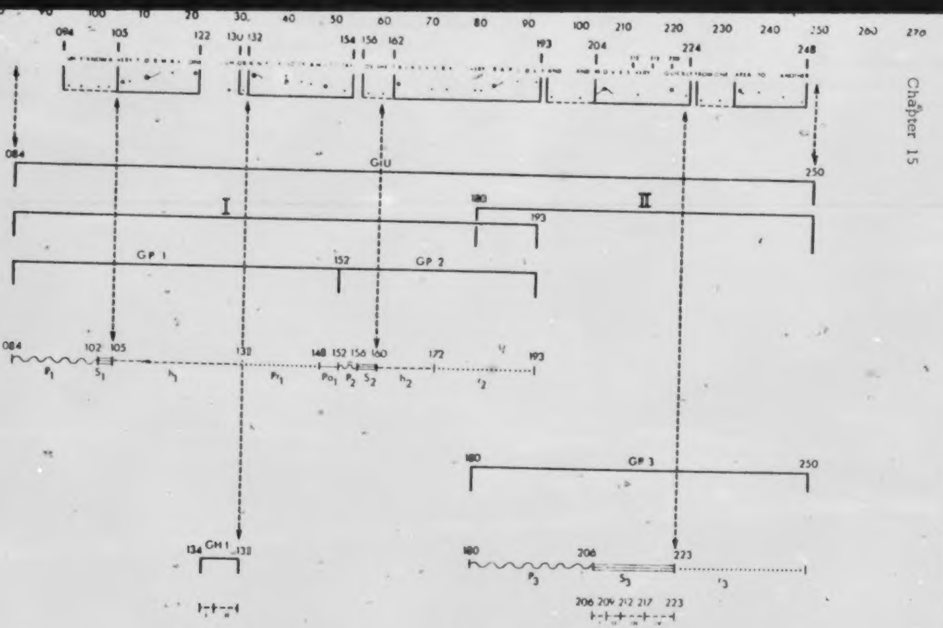
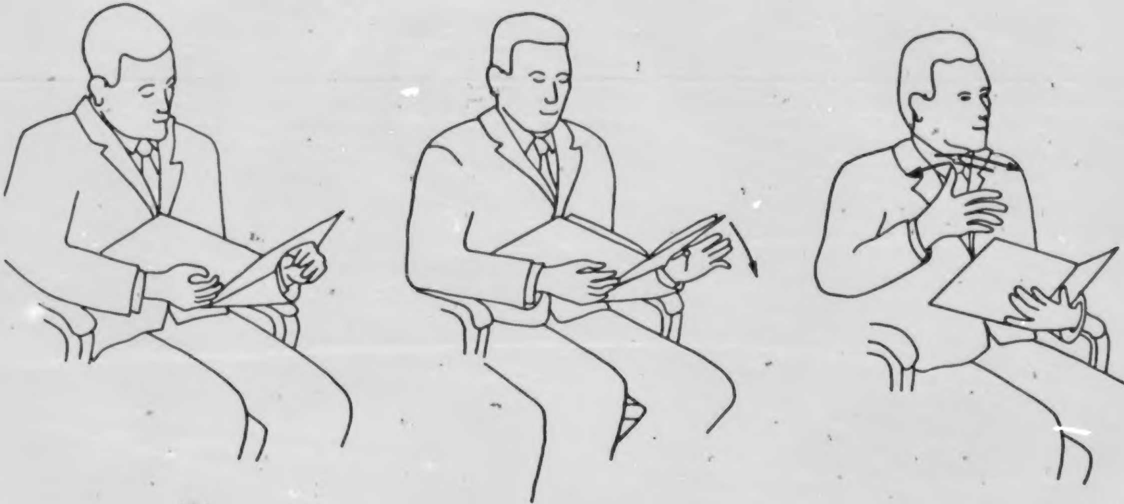

GU
084
250
I
II
180
193
GP 1
152
GP 2
084
102
105
132
148
152
156
160
172
193
p_1
s_1
h_1
Pr_1
Pa_1
p_2
s_2
h_2
r_2
180
GP 3
250
134
GH 1
138
180
206
223
p_3
s_3
r_3
206
209
212
217
223

Figure 1. Diagram to show the organization of a Gesture Unit and its relationship to the vocal aspect of the utterance. The utterance is taken from the film ISP 001 63, frame nos. 11070-11270. The boundaries of tone units are shown by solid vertical lines immediately below the text. The head section of each tone unit is marked by a continuous horizontal line, the pre-head section by a dotted line. Intonation patterns for each tone unit are written below the text. GU - Gesture Unit; GP - Gesture Phrase; p - preparation; s - stroke; h - hold; Pr - partial recovery; Pa - pause; r - recovery; GH - Gesture Phrase in Head. Vertical broken arrows indicate relationship of components of the gesture phrases with components in the vocal aspect.



2(a)

2(b)

2(c)

(a) position of hands prior to the Gesture Unit

(b) "umbrella" form of left hand in G-Phrases 1 & 2; arrow shows direction of movement in stroke phase

(c) position of right hand in G-Phrase 3; arrows show pattern of movement in the stroke phase of this G-Phrase

Figure 2. Tracings from film ISP 001 63 to illustrate hand position in the G-Unit shown in Figure 1.

dominant. Similarly in S 134 (an utterance of the psychiatrist who presented the case to the group), the discourse is divisible into three Clusters. Over the first, which is very short, S uses his left arm; over the second he uses his right arm; and over the third he again uses his left arm.

Second, in all of the examples we have analyzed so far, each Locution has its own G-Unit. That is, boundaries of Locutions are associated with the gesticulatory limb either at the rest position, or with it being in the phase of return to that position. Furthermore, within each G-Unit, the pattern of movement observed is different. This also confirms what was found in the previous analysis: each Locution is associated with a distinctive Unit of gesticulatory activity.

Third, whereas in the previous example, as we saw, each Tone Unit was differentiated with a distinct pattern of gesticular organization--each Tone Unit was found to be matched with a distinct G-Phrase--in the other examples we have analyzed this relationship between Tone Units and G-Phrases has been found to be somewhat more complex. In F 42, for example, in which there are twenty-six Tone Units, twenty of these had a corresponding G-Phrase. Of the other six Tone Units, three, occurring in succession, shared a single G-Phrase (which extended over the entire sequence of the three), while the other three Tone Units each had associated with them not one, but two G-Phrases. Likewise in D 43 and in S 134, we found groupings of Tone Units covered by a single G-Phrase.

An examination of just which Tone Units are grouped by a single G-Phrase and which co-occur with one or with more than one G-Phrase, suggests that the G-Phrases are manifestations of the "idea units" the utterance is giving expression to and are linked o the output of Tone Units only as closely as this itself is linked o the expression of "idea units". For example, in F 42, Locution 4 s as follows:

(10) (11) (12)
/but all through/ you you sensed/ that she and father/ are
(13) (14)
being very seductive/ with each other/ (nuclear syllables of

each Tone Unit are underlined). A single, though complex, G-Phrase occurs over Tone Units 11 to 14, in which the forearm is moved back nd forth in front of the body, with the hand held palm inward. This movement would seem to embody two items in interplaying relationship with one another. Thus, though it takes a succession of Tone

Units to specify "patient" (she) and "father" and their "relationship", a depiction of their relationship is here given in a single G-Phrase. On the other hand, also in F 42, we have the Tone Unit "and supposedly re*buffs* her", and in association with this two G-Phrases are performed. In association with "re*buff*" the hand is held with the palm facing the body, the upper arm rotated inward at the shoulder so that the forearm crosses the body. As the nuclea syllable of "rebuff" is uttered, the thumb is moved rapidly outwards in a pushing-away movement. This, however, was precede by a movement of the whole arm, in which the arm is raised and then lowered slightly and also moved towards the body. However, as it is so moved it also is moved in a series of rapid, in-out motions of small amplitude. Such rapid back and forth movement is not uncommonly seen in association with expressions such as "partly", "more or less", or "somewhat". Here it appears, thus, that in the single Tone Unit in which the idea of "rebuff" and of its *supposed* character is given expression, these two aspects are given separate expression in two G-Phrases.

In D 29 and D 43 we find examples of a single G-Phrase, here taking the form of a sustained hand position, being held over two or three Tone Units which are all linked by a common theme. In D 43 and also in S 134 we find groups of Tone Units in which only one conveys new information, the others serving to link this piece of new information with the previous or succeeding argument of the discourse. Here a G-Phrase associated with the new information is performed, but it co-occurs with the Tone Unit grouping (Locution) as a whole, and does not mark out the separate Tone Units.

The degree to which the different levels of organization in discourse are marked by separate G-Phrases appears to be a matter of some variation, at least below the level of the Locution, and further analyses will be needed before we will be in a position to specify anything about what factors might be related to this. However, it would appear that whereas the structure of the movement pattern in gesticulation is closely integrated into the rhythmical structure of the co-occurring speech stream (Condon and Ogston's work has shown how very close this is), in terms of the phrasal organization of the gesticulation a distinct phrase of gesticulation is produced for each unit of meaning or "idea unit" that an utterer deals with. This means that the phrases of gesticulation that co-occur with speech are not to be thought of either as mere embellishments of expression or as by-products of the speec process. They are, rather, an alternate manifestation of the proc by which "ideas" are encoded into patterns of behavior which can be apprehended by others as reportive of those ideas. It is as if the process of utterance has two channels of output into behavior: one by way of speech, the other by way of bodily movement.

Further analyses of the relationship between Speech Units and Gesticulation Units and Phrases. An examination of the relationship in time between the nucleus of a Tone Unit and the stroke of its associated G-Phrase shows that the stroke of the G-Phrase is completed either before the Tone Unit nucleus, or just at its onset. This phenomenon was reported in Kendon (1972) and it is confirmed in our later analyses. Thus in F 42, in which there were 22 Tone Units with a matching G-Phrase, in fifteen instances the stroke was completed either before or simultaneously with the onset of the tonic syllable; there were six instances in which the stroke was completed by the end of the tonic syllable; and only one instance in which the stroke continued after the tonic syllable. In all instances the gesture phrase began well before the tonic, and in most instances it began before the onset of the head of the Tone Unit. In none of the material we have analyzed is there a single instance of a G-Phrase following its associated Tone Unit. It either co-occurs with it or precedes it. Where we are dealing with the first Tone Units of a discourse, furthermore, if gesticulation occurs during the first such Unit it always begins before speech begins. Usually only the preparatory phase of a G-Phrase is enacted before speech, but occasionally complete phrases are enacted. An example of this was described in Kendon (1972).

The appearance of G-Phrases somewhat in advance of the appearance of speech phrases with which they are associated means, of course, that the G-Phrase must have been organized at least at the same time, if not a little in advance of its associated speech phrase. Thus the G-Phrase must be seen as originating simultaneously with the origination of speech and not as a product of the speech production process.

Further indication that the gesticulation associated with speech is an alternate manifestation of the same encoding process is provided by an examination of the relationship between G-Phrases and speech phrases in which there are pauses or hesitations. For example, in many cases where a Tone Unit has already begun, and a pause occurs between the prehead and the head onset, if a G-Phrase is also under way, it may continue to completion despite the interruption in the flow of speech. Indeed from several examples we have analyzed, it seems that the speech is only resumed once the stroke of the G-phrase has been completed. Here it would seem that, despite the pause, the speaker had already organized the semantic structure of the next part of the utterance, for the G-phrase that is performed in the pause is well formed, clearly embodying the content of what is also produced in speech. Such within-Tone Unit pauses where kinesis continues reflect, thus, an interruption in the speech production process but not an interruption in the process of utterance.

An example to illustrate this (full details must await another publication) is F2, taken from the beginning of film ISP 001 63, where the participants are settling in their seats and discussing in an informal way what is going to happen in the main part of the session. F makes a joke based on a scene in Wilder's film, Some Like it Hot. She says: /they wheel a big table in/ with a big with a big [pause] cake on it/ and the girl/ jumps up/ —here someone else fills in for her with the phrase, "with a machine gun."

This speech, here comprising but one locution, may be divided into four Tone Units. For the first three of these there are three corresponding G-Phrases, and the form of movement in the stroke in each has a clear relation to the content of what F is saying: thus in G-Phrase 1, F sweeps her left arm inward in a horizontal motion—associated with "they wheel a big table in." In G-Ph. 2, co-occurrent with Tone Unit 2, F makes a series of circular motions with the forearm pointing downwards and with her index finger extended, here describing in movement the shape of the cake. In G-Ph. 3, she raises her arm rapidly until it is fully extended vertically above her. This is clearly a "jumping up" movement, the action of the girl F is referring to, though the action, it will be seen, is not referred to verbally until the last Tone Unit, during which F is not producing a new G-Phrase but is recovering from the previous G-Phrase.

Looking at the relationship in time between the components of these G-Phrases and the flow of speech, it appears first that the stroke of G-Ph. 1, the horizontal inward movement of the left arm, commenced precisely at the same moment that F's speech began, but its preparation, the lifting of the arm to the position from which it commences the inward sweep, began just 19/24ths of a second before this. Second, it will be noted that the second Tone Unit is broken up: its pre-head is spoken twice and then there is a pause of 26/24ths of a second before the rest of the phrase is uttered. It is during this pause that the rotary movements of the second G-Phrase are produced. The head section of the Tone Unit "cake on it" is uttered as the limb recovers from the stroke. Here, then, though speech was arrested, this part of the utterance was continued to completion kinesically.

In the next G-Phrase, as we have see, F raised her arm rapidly to a vertical position. This movement matched precisely the tonic of the Tone Unit—the word girl—but as we have already noted, the form of the movement referred not to the girl but to her action of jumping up, which is nevertheless given verbal expression in the next and final Tone Unit. Thus although in phrasal organization F's speech and gesticulation become once again aligned, in semantic content the gesture was performed well in advance of the verbal reference.

As we have seen, phrases of gesticulation tend to appear a little in advance of their associated speech phrases, and their preparation begins sometimes well in advance. This suggests, as we have said, that the processes of speech utterance and gesture utterance begin at one and the same time. The temporal priority of gesture may partly be due to the fact that for a given idea to be expressed in words it must be strung out in time, whereas the same idea may be expressed in a gesture within a single movement or pose of the hand. However, the observation that speech production may be interfered with while gestural production is not, may also suggest that the process of gestural encoding is more readily accomplished than that of verbal encoding and so may be faster for this reason.

Conclusion. We have argued that gesticulation is a second product of the process of utterance. Insofar as utterance makes use of the vocal channel, use is made of a complex code, language. In the kinesic channel, however, the movement patterns that are employed in gesticulation do not appear to have properties that are like the lexical and syntactic character of spoken language, though they do appear to share in the dynamics of their organization some of the prosodic features of speech, at least in the speakers of English to which this sort of analysis has been confined. Thus we have seen how gesticular phrases may be distinguished in terms of nuclei of kinesic emphasis, much as Tone Units may be distinguished in terms of nuclei of vocal prominence. There is when the whole is considered some reason for thinking that intonation tunes may have their parallel in kinesic organization. Thus Birdwhistell (1970) has reported that a lowering of a gesticulating body part co-occurs with a falling terminal juncture in speech, and that where a gesticulating body part is sustained or held at the end of an utterance, the pitch of the voice is also either sustained or raised. Several examples of our own, which will be reported in detail elsewhere, show that in questions in which the pitch of the voice is raised or held, concurrently the head or hand is also raised or sustained.

However, gesticular movements, although shaped in part in parallel to the prosodic structure of the concurrent speech, also are patterned in ways that are clearly related to the content of what is being expressed. Furthermore, in the various poses the hands may assume, we can also see manifestations of aspects of the content. The relationship between the content of the gesticulation and the content of the speech is a highly complex one and we cannot undertake a detailed review of this here. To date the most thorough treatment of this still remains that of Efron (1941). Here we will cite a few representative examples from our own material to show that the mode by which ideas are encoded in gesticulation is quite different from the way in which they are encoded in language.

First, the speaker may depict in gesture some object or action he is referring to in speech. Thus in the "cake" example, F 2, given above, F performed movements that were analogous to movements that would be made of wheeling in a table or jumping up; she also made a movement that outlined the shape of the cake she was talking about. Movements characteristic of aspects of action are indeed very common. In F 42, which we already have alluded to, F continued her description of the patient's relation to her father by saying "and she doing things to annoy him, to attract his attention, to outrage him." Over each of these three Tone Units she moves her hand outward in a rapid "slapping" movement, which has the dynamic character of actions that, addressed to another, would provoke or tease. In D 43, in asking why both the psychiatrist and the social worker F had had difficulty in getting the patient to tell her history, D says "...maybe it's because Pete doesn't want to nail down this attractive bit of fluff or something." As he says "nail down" he raises his right arm, hand posed as if it is holding something, and he performs a series of forward thrusts, an action sequence which has the character of knocking nails into something, as one might if one were nailing a notice to a door.

In these examples the speaker seems to be creating a gestural form *de novo* to suit the immediate utterance. Sometimes, however, he makes use of a gestural form that is more or less conventionalized. Thus, in the example just mentioned, when D says "bit of fluff" he raises both hands, palms facing inwards, and performs sinuous in-out movements, thus performing a well known gesture which means 'shapely woman'. Such conventionalized patterns may take on the status of gestures which can be given a meaning when presented in isolation. These have been termed "emblems" by Ekman and Friesen (1969).

Gesticulation does not only depict objects, actions, or behavior styles of others being described. It may also be used to encode more abstract features of the utterer's discourse. For example, it may refer to the overall theme of the utterer's discourse, rather than to particular parts within it. Thus, in the first part of D 43, D says: /How about this *his*tory business/ you *Pete*'s havin' trouble getting a history/. As he says this, his hands are held forward, palms facing each other in a "framing" arrangement. This double hand frame was sustained throughout the series of tone units in this part of the utterance, which are linked together by the theme of "getting a history". In other instances a sustained hand position may be observed which appears to mark the *kind* of utterance that is being produced. Thus we have collected many examples in which a sustained position of an open palm extended forward marks a question or an utterance in which the performer is putting forward an example for discussion.

Gesticulation may also in various ways make visible the organization of the discourse. We have already referred to the way in which body use is differentiated in association with different segments of the discourse. However, at times one may observe gesticulatory patterns that appear to have this function particularly. In a discourse recorded in the film TRD 009 (not described in Kendon, 1972) the utterer, X, describes certain features of the British Northerner. As he does so, each Tone Unit is marked by a distinct rotary movement of the right arm, while he holds his left arm forward and slightly bent at the elbow. This is sustained for this segment of the discourse, apparently framing or tying together the separate statements he is making.

The foregoing is intended to suggest that there are many different ways in which gesticulation may be related to the content of an utterance. Gesticulation and speech work together in an intimate relation of great flexibility and subtlety. However, as we have already suggested and as these examples make clear, the mode of encoding of content is quite different in gesture from the mode of encoding in speech. Whereas in language highly conventionalized forms from an already established vocabulary are used, which are organized sequentially according to grammatical rules, in gesticulation encoding is presentational. Though conventionalized forms may be used, the utterer has considerable freedom to create new enactments which do not then pass into any established vocabulary. As far as can be seen at the moment, gesticulation is not composed of elements which are formed into constructions according to a syntax. They occur, rather, as a succession of enactments which express in presentational fashion, the ideas which may also be given discursive expression in speech. The sequencing of gesticular phrases and units is governed by the order of presentation of ideas in the discourse.

We have also seen how gesticular phrases must be constructed in advance of their performance, just as speech phrases are, and that they appear to originate at a very early stage in the process of utterance. Recent developments in linguistic theory have led many to the view that it is the semantic organization of an utterance that is the starting point for the processes by which its surface structure is eventually generated (Maclay 1971, Leech 1974). Most particularly in this connection we may mention the views of Wallace Chafe (1970) who has argued explicitly for the position that the process of utterance generation proceeds through a series of stages, starting with the organization of semantic structures. The work on gesticulation we have reviewed here would suggest that this earliest stage in the process of utterance formation has, or can have, a direct expression in behavior.

If we accept the view that in producing an utterance a speaker starts with something which he wishes to say--we may call this an "idea complex"--in order to translate this into a behavioral form which can be "read" by a recipient as a report of this idea complex, the idea complex first has to be organized in some way into package or units which can form the basis for the planning of actions which will function for a recipient reportively. Because of limitations imposed upon expression both by the way in which actions themselves may be executed and by the way in which they can be taken cognizance of by a recipient, the organization of an idea complex into packages which must then be enacted sequentially is inevitable. Clearly, however, this process of linearization proceeds furthest in the production of speech. In gesticular expression, thus, we have an output that reflects an earlier stage in this process of translation from idea complex to report. The further analysis of gesticulation, thus, may provide a means of gaining much insight into the process of utterance.

Let us now return to the theme with which we began. Hewes (1973) remarks at the end of his paper, as a further point in support of the theory that language was originally gestural in form, that "gesture did not wither away, but persisted as a common accompaniment to speech, either as a kinesic paralanguage for conveying nuances, emphasis, or even contradiction of the spoken message...or in situations where spoken language fails...(p. 11). The work we have reviewed here would suggest that a much stronger statement is warranted. Our observations suggest that gesture is not so much a common accompaniment to speech but that it is an integral part of the whole act of uttering; that it is not just a kinesic paralanguage but that it may be employed, even in the apparently highly verbal situations we have studied, to encode many different aspects of the ideas being given expression. The notion that gesture may convey nuances, emphasis, or contradiction is correct. However, it also may encode the most central and abstract ideas also being encoded in speech.

It is obvious that gesticulation is not an invariable accompaniment of speech, at least not in an overt and readily observable form, and it would be extremely useful to have much more detailed information on the circumstances in which it does or does not occur. Systematic work on this question is surprisingly scant, however. It has been suggested (Ekman and Friesen 1972) that gesticulation increases with excitement and enthusiasm or where the speaker has a dominant role in the interaction. Gesticulation also increases where feedback from the listener suggests difficulty of comprehension and also where the speaker himself has difficulty in finding the right verbal forms for what he has to say. This last point has also been suggested by De Laguna (1927) and by Werner and Kaplan (1963). Cohen and Harrison (1973) compared the frequency of gesticulation when speakers give directions to someone over an intercom and when they gave similar directions to the other person face-to-face, and they found an increase in gesticulation in the latter situation. Baxter, Winter, and Hammer (1968) found that speakers speaking fluently on a subject with which they were familiar, gesticulated more frequently than did those who spoke on subjects they were not so familiar with. For our immediate purposes, however, it is sufficient to note both the immediate and universal availability of gesticulation as a mode of utterance and its intimate and deep connection with speaking. Speakers, indeed, are usually hardly aware that they gesticulate, so spontaneous a part of the whole process of utterance does it appear to be.

This intimate connection between gesticulation and speech would seem to be consonant with the idea that in its emergence language, or reportively functioning behavior, was at least as much gestural in form as it was vocal. What is striking is the fact that though gesticulation operates as a mode of expression even as speech is also operating, it is encoding ideas in a completely different manner. Theories of the evolution of language must be able to account for this as well as be able to account for the emergence of speech. A much fuller and closer look at the mode of encoding in gesture would appear to be warranted.

The fact that gesticulation tends to anticipate speech, that speech may be disrupted though concurrent gesticulation continues to go forward smoothly, and the fact that on occasion a gestural response may be given first before any speech whatever is begun, does perhaps provide a hint that the gestural channel is easier and more readily called upon, that the process by which an idea is transformed into public behavior of a reportive character is more swiftly accomplished gesturally, that there are fewer steps to the process than there are when formulation of the "idea" into speech is to occur. The least we can say about this is that we would not, perhaps, expect a more elaborate and time-consuming method of utterance to be the one that was first developed in language evolution.

In conclusion, we would urge that a distinction be drawn between speech and other modes of idea expression which may nevertheless be seen as manifestations of the process of utterance. In formulating theories about the origin of language, thus, we must attend to two great questions: First, how did the human species acquire the ability to engage in reportive behavior? Second, how did this reportive behavior become specialized in the form of speech?

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PART FOUR: 16

THE CREATION OF A COMMUNICATION SYSTEM IN DEAF CHILDREN OF HEARING PARENTS

Susan Goldin-Meadow
Heidi Feldman

Problem. Common knowledge has it that when you talk to a child in English the child learns to speak English, and when you talk to a child in Japanese the child learns to speak Japanese. It is also now well known that when you sign to a child in American Sign Language the child learns to sign in American Sign Language. But what if you neither talk nor sign to a child? Will the child be able to communicate with others, and if so will the child's spontaneous communication have any or all of the properties of natural languages?

To answer these questions about the role of linguistic input in the development of symbolic communication systems, we have observed a population that, in some sense, has been neither talked to nor signed to at all. Our subjects are deaf children, whose severe hearing losses prevent them from acquiring any spoken language in the natural way. Furthermore they are deaf children whose hearing parents have consciously decided not to let their children see a standard manual system or sign language and to concentrate instead on oral education. At the time of our study, our subjects had benefitted very little from their oral training. Our study was designed to observe the symbolic systems that our subjects might spontaneously create in order to communicate despite their lack of an obvious linguistic model to guide their communicative development.

Method. Our sample included four children ranging in age from one and one-half to four years. We visited each child in his home at intervals of approximately six weeks. Data from two of the children, David and Dennis, are reported on in this paper (see Table 1). At each visit we gave the child a variety of toys to play with, and we taped his activity with the toys in the presence of other hearing participants—the investigators and the child's parents. Although we recorded both the spoken and the gestural behaviors of our subjects and the parents, we became interested primarily in the gestural output of the deaf children. We concentrated on the gestural behavior simply because these children seemed to make very little systematic and spontaneous use of vocalization, unquestionably as a result of the hearing impairment.

Subject's name	Taping session	Age in yrs; mos
David	I	2 ; 10
	II	2 ; 11
	III	3 ; 0
	IV	3 ; 3
	-	
	VIII	3 ; 10
Dennis	I	2 ; 2
	II	2 ; 3
	III	2 ; 4
	IV	2 ; 6

Table 1. Summary of videotaped data.

We used our videotapes to develop a coding system of the form and meaning of the gestures employed in communication. Our first task was to pull the gestures out of the stream of ongoing motor activity. To accomplish this we set up two criteria for a gesture: (a) the gesture must be directed to another person (this criterion is met if the child makes some attempt to establish eye contact with the person); (b) the gesture must affect the partner through its symbolic meaning and not as a direct motor act (e.g. if a child physically restrains the partner, we do not consider this a gesture, but if the child holds up an open hand in a stop-like gesture, he is indirectly restraining the partner through the symbolic meaning of the gesture).

After discriminating gestures from other motor acts, we characterized the form of each gesture along the dimensions used to describe the phonology of American Sign Language (ASL) (Stokoe 1960, 1978). We also coded the number of gestures contained within each gestural phrase. The assignment of gestural phrase boundaries was done with reference to the time interval between gestures, the continuity of movement, and the return to neutral position (hands in a relaxed position in front of the body), as is done in marking boundaries in ASL. Spot checks of reliability between two independent observers yielded 86% agreement on the isolation of gestures from the behavioral stream and the assignment of gestural form and gestural phrase boundaries.

In addition we coded the children's gestures according to the meanings they conveyed. Following Bloom (1970, 1973) we relied on context both to determine the meanings of single gestures and to determine the semantic relations represented by gesture phrases. Each gesture in a combination or phrase was assigned to a semantic role or case (cf Fillmore 1968) according to its referent's relationship to the referents of the other gestures in the combination. Thus, if the child produced the gestural combination signifying 'mommy doll' when mother dressed the doll, then we considered the gesture for mother to be the agent and the gesture for doll object or patient. The same combination could be produced after the mother had received the doll. In this case the gesture for mother was classified as person (or dative case) and that for doll would again be object. An independent observer using our context code agreed with our assignment of meanings to 94% of the gestural phrases.

Results. We find that the deaf child does indeed develop a gestural system for the purposes of communication. The developmental course of this gestural system is remarkably similar to the early stages reported for the hearing child learning to speak. At this point in our study, we have isolated three phases of development from cross-sectional data. We have data on two children in the first phase and on two different children in the second phase; one child in this second phase has progressed during our period of observation to give us data on the third phase.

In the first phase of development the deaf child uses very few different gestures and is limited to single-unit or single-gesture phrases. The deaf child produces these single gestures in the same contexts in which are found the hearing child's early single words (Bloom 1970, 1973). For example, the hearing child may say "More" when he wants an additional cookie; the deaf child extends his hand, palm up, toward the potential agent of giving and the desired object. When the hearing child sees a rabbit hopping across the room, he may say "See" or "Dat"; in this situation the deaf child will point an index finger at the object. At this moment in development, both the deaf and the hearing child's symbols are ambiguous; we cannot determine from the child's word or gesture which aspect of the whole situation he is referring to. In the example given we cannot decide whether he is referring to the rabbit-ness, the hopping-ness, or the tail-ness of the situation. The child lacks specificity in his communication, a lack that both hearing and deaf child remedy in the next phase of development.

In the second phase there are two developments of the communication system; our data suggest they are simultaneous: (a) the deaf child creates lexical items to specify individual objects and actions; (b) the deaf child specifies the relations between objects and actions by combining gestures into two-unit phrases according to his own gesture-ordering rule.

In his lexicon the deaf child symbolizes an action with an action gesture; e.g. if the child wants someone to open a jar for him, he moves his hand in a twisting motion in the air —in this case the gesture specifies an action he would like done. However the deaf child also uses gestures involving action to symbolize objects; in other words, in a different situation when no action has been, can be, or will be performed, the child uses the same twisting motion to specify the jar itself. [Since the original publication of this paper, Supalla has made it clear (Supalla & Newport 1978) that characteristic regular difference in gestural action distinguishes ASL verbs from ASL nouns; as yet we have no information on how early deaf children in an ASL environment make this grammatical distinction.] This motor iconic representation system allows the deaf child to be fairly precise in his symbols. For instance, he can distinguish the symbol for banana (a fist at the mouth accompanied by opening and closing of the mouth) from the symbol for ice-cream cone (a fist at the mouth accompanied by tongue licks). These motor iconic gestures continue to be used by older deaf children.

Table 2 presents a summary of the specific lexical items produced alone and in combination by the two children we have observed in the second phase of development. The data in this table provide us with three interesting facts about the deaf child's lexical development. First, both children produce a number of different specific lexical items; i.e. a number of types (col. 1). Second, these different lexical items often occur more than once in the sample; i.e. the number of tokens (col. 2) is larger than the number of types. Third, the specific lexical items do occur in gesture combinations, i.e, as part of the entire symbolic system (col. 3, Table 2).

Subjects	TYPES[a]	TOKENS[b]	
		Alone	In Combination
David	56	107	62
Dennis	25	50	19

Table 2. Lexical items produced by David and Dennis in sessions I-IV.

In addition to these lexical gains, the deaf child at this time also begins to combine gestures to symbolize semantic relations; e.g. he points at the hat he desires (object) and then, without breaking the continuity of his movement, points at the top of his head (location). He has explicitly coded two arguments, or cases, of the relation, and from the context we infer the implicit relation 'put'. In Figure 1 we see a summary of the pairs of cases coded in each child's two-gesture combinations. The children expressed three predominant relations in their two-gesture combinations: action, loçation, and possession. Furthermore, they expressed these most frequent relations by using the same simple ordering rule: semantic object first, then action, location, or possessor. Figure 2 presents only those combinations that occurred more than five times during an observation period.

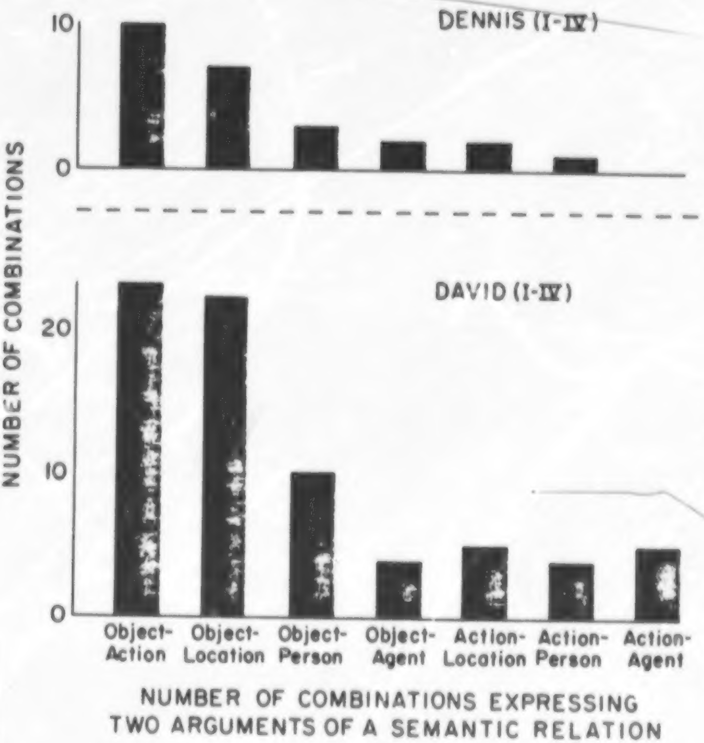

DENNIS (I-IV)
10
0
DAVID (I-IV)
20
10
0
NUMBER OF COMBINATIONS
Object-Action
Object-Location
Object-Person
Object-Agent
Action-Location
Action-Person
Action-Agent
NUMBER OF COMBINATIONS EXPRESSING TWO ARGUMENTS OF A SEMANTIC RELATION

Figure 1.

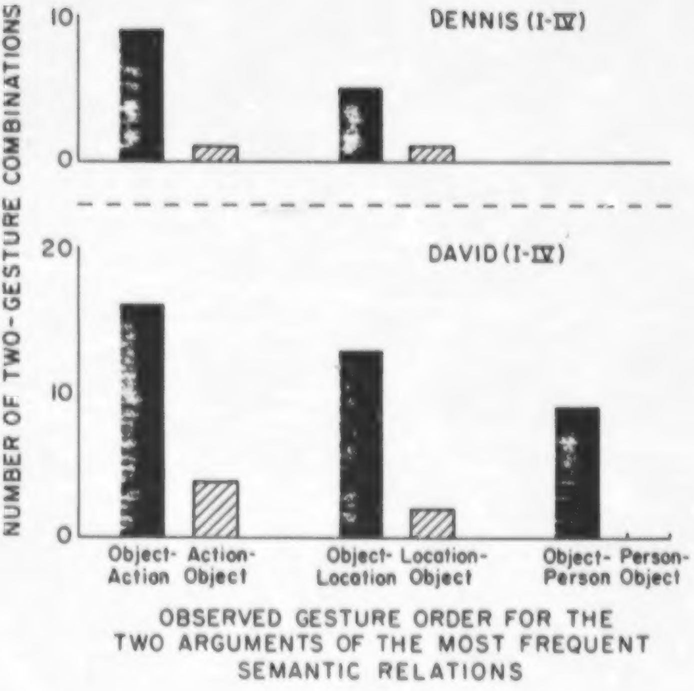

NUMBER OF TWO-GESTURE COMBINATIONS
DENNIS (I-IV)
10
0
DAVID (I-IV)
20
10
0
Object-Action
Action-Object
Object-Location
Location-Object
Object-Person
Person-Object
OBSERVED GESTURE ORDER FOR THE TWO ARGUMENTS OF THE MOST FREQUENT SEMANTIC RELATIONS

FIGURE 2.

In this second phase of development, the deaf child has created a means of specifying objects, actions, and the relations between them. The hearing child at a comparable point in his language development also begins to produce specific lexical items and to combine words (Nelson 1973, Goldin-Meadow, Seligman, & Gelman 1974); he thus uses linguistic structures much like those the deaf child with no linguistic model uses to attain the same level of specificity in communication.

There is a third phase of development in which the deaf child combines more than two gestures in one phrase in order to symbolize more than one semantic relation; e.g. the child points at the picture of a bird beak on a puzzle piece, then points at his own mouth to denote the similarity between the two, and then points at the spot in the puzzle where the bird-beak fits. Thus the child has specified two aspects or relations to the bird beak: similarity and location. In another example, the child symbolizes in one phrase that the shovel is used to dig outside when it snows, is associated with boots, and is kept downstairs. The data at the moment suggest that the child may be conjoining semantic relations in one phrase in a rule-governed, as opposed to a random, fashion. An increased data base is necessary to determine the reliability and the nature of these potential rules.

In summary, we have isolated three phases of development that the deaf child goes through in creating a gestural communication system in the absence of any linguistic model presented to his working senses. It is possible that the deaf child bases this communication system on some input model however. One hypothesis is that the child's parents generate this gestural system of phrases, which the child then imitates.

To test this hypothesis we observed and videotaped the mother's spontaneous gestures and subjected these gestures to the same analysis we used on the child's gestural output. We found that although the mothers generated as many names for objects and actions as the children generated during the sessions (see Table 3, columns 1 & 2), they did not develop the same lexical items that the children developed. Furthermore, the mothers very rarely produced their specific lexical items in combinations encoding semantic relations, while the deaf children frequently did (Table 3, col. 3). Even when the mothers did combine gestures, their combinations were

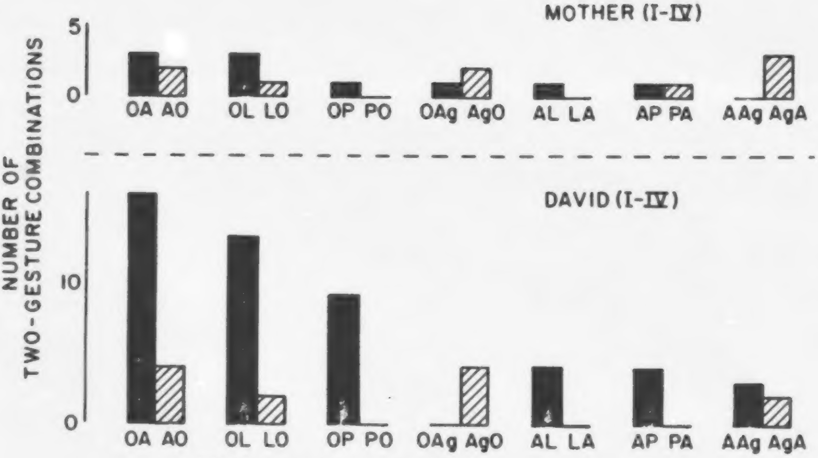
Subjects	TYPES[a]		TOKENS[b]			
			Alone		In Semantic Relation Combinations	
	Child	Mother	Child	Mother	Child	Mother
David	56	54	107	90	47	9
Dennis	25	23	50	58	18	3

[a] Types = Number of different lexical items.

[b] Tokens = Number of lexical occurrences across types.

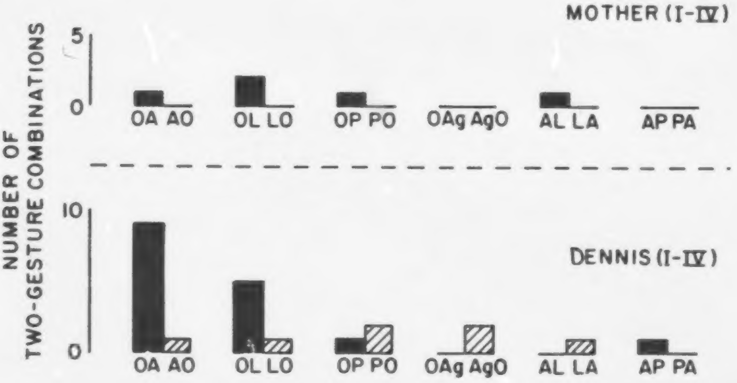
Table 3. Lexical,items (gestures) produced in sessions I-IV by child and mother.

not rule-governed as the children's combinations were (Figs. 3 & 4). In general, we found that the mothers developed the combinatorial skill several recording sessions after the children already had exhibited this skill in their gestural output. Thus, the deaf children have not even been exposed to a spontaneous gestural system that might have served as a rule-governed model for their symbolic development.



SUMMARY OF MOTHER-DAVID COMPARISON
OF GESTURE ORDERING RULES FOR
TWO ARGUMENT SEMANTIC RELATIONS

FIGURE 3 (above). FIGURE 4. (below).



SUMMARY OF MOTHER-DENNIS COMPARISON
OF GESTURE ORDERING RULES FOR
TWO ARGUMENT SEMANTIC RELATIONS

Discussion. Our deaf subjects differ from hearing children of language acquiring age in two important ways: first, the deaf child uses the visual-gestural modality as the natural channel for symbol reception and production; and second, the deaf child does not receive an obvious linguistic model to guide his communicative behavior. Despite these differences, the deaf child develops his gestural communicative skills in the same sequence of stages that appear in the hearing child's development of spoken language skills. In particular, the deaf child invents names for actions and for objects, and syntactically codes semantic relations between actions and objects. Thus our data indicate that these linguistic skills can be expressed in a manual, as well as a vocal mode. Studies of adult sign language confirm this finding (cf Bellugi & Fischer 1972). In addition, our data show that the ontogenesis of these skills does not depend on an obvious linguistic model. We know that the child can create a simple system of communication with no input model; however it is not clear from our present data exactly how far the child can progress without the benefit of such a model.

Of course, if the child is supplied with a model in either the manual or vocal mode, he will by and large conform his particular names and syntactic orderings to that model. But where does the deaf child who has no obvious linguistic model get his particular names and syntactic orders? We hypothesize that the deaf child generalizes and abstracts from actions in the world in order to create names for objects and for actions. For example, the twisting motion of the wrist used in the act of opening a jar becomes stylized into the deaf child's gesture with both meanings, 'jar' and 'open'. Abstracting from actions is a process particularly compatible with the motoric mode the deaf child uses. Young hearing children, who sometimes create names by using speech sounds, even though they are exposed to a linguistic model, often use an onomatopoeic process, e.g. "num-num" for food. We suggest that the hearing child is abstracting from sound just as the deaf child is abstracting from action. Presumably sound is as natural to the vocal mode of production as action is to the motoric mode. Thus here we have an example of how the modality by which the symbols are expressed alters the form that the symbols take.

Similarly, we hypothesize that the deaf child's rule of ordering object first may be induced from his motoric acts on the world; e.g. if a child wants to relocate an object, he must first situate that object and then move it to its new location—the object occurs before the location in the child's motor action schema. We suggest that the child uses this ordered motor action schema as a basis for his symbolic representation of the same event (cf McNeill 1974).

In summary, we have shown that symbolic communicative behavior is a resilient skill that develops in children of normal intelligence who interact with human beings and with objects. Symbolic communication can begin to develop despite severe auditory impairment and in the absence of an obvious linguistic model.

Our study, in conjunction with current work in sign linguistics, allows us to consider how certain variables affect the particular form a language will take. The modality through which a language is produced and received (e.g. the vocal apparatus and the ear) is one variable that in part shapes the form of the language. Since contemporary sign languages differ from spoken languages in modality, a comparison of the two different systems points to the effects of modality on linguistic structure (cf Bellugi & Fischer 1972, Stokoe 1974, Battison 1974, Siple ch. 14). Language change over generations comprises a second variable that shapes the form of a language (Bever & Langendoen 1971). American Sign Language, like spoken languages, has undergone historical change (Frishberg 1975). Our deaf subjects, however, do not have a historically based linguistic model available to them. The communication system they have created illustrates the influence of modality on linguistic structure without the influence of historical change. Thus our data suggest how two factors, modality and lack of historical model, contribute to the design features of a language.

NOTE

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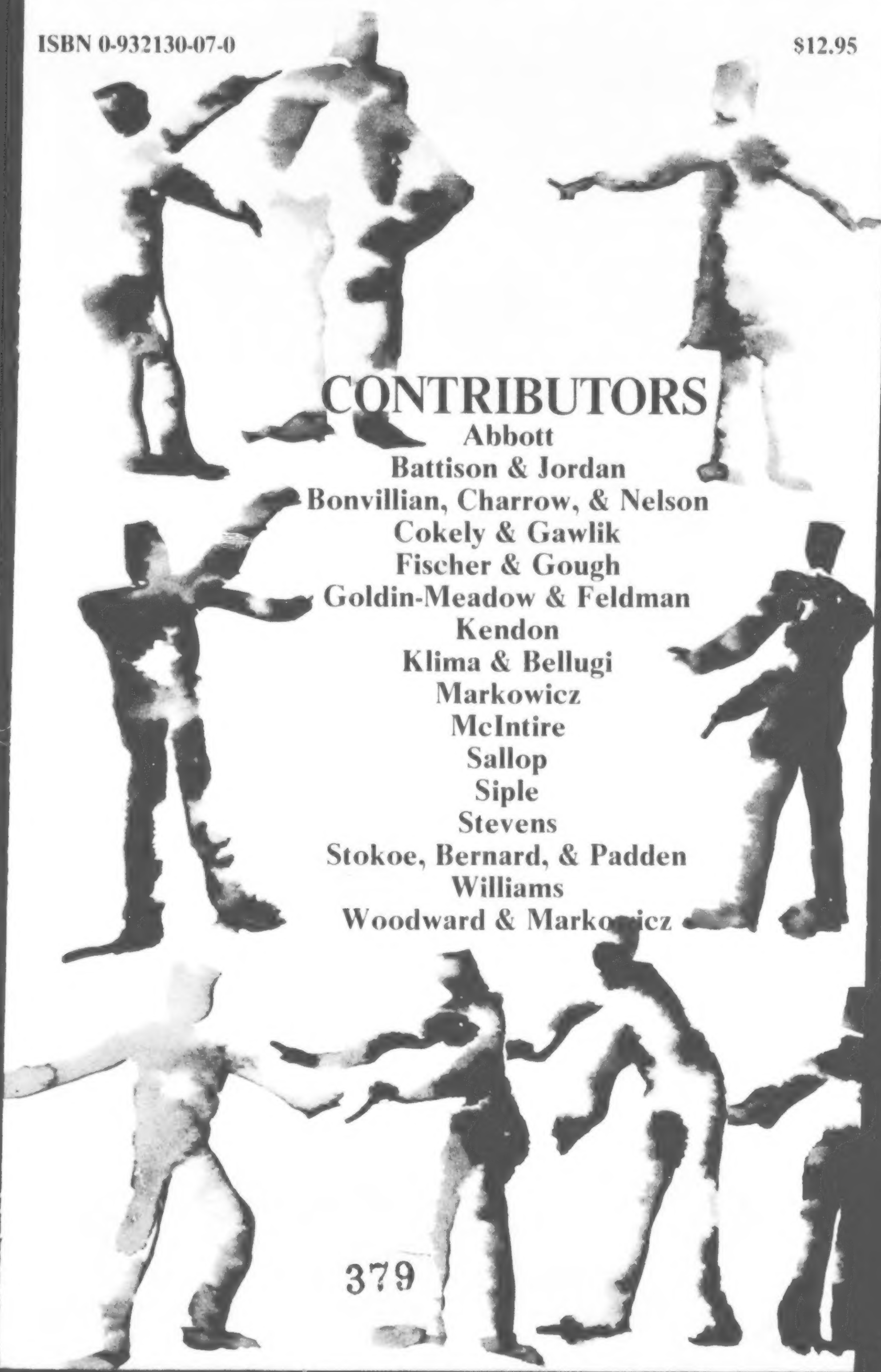

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